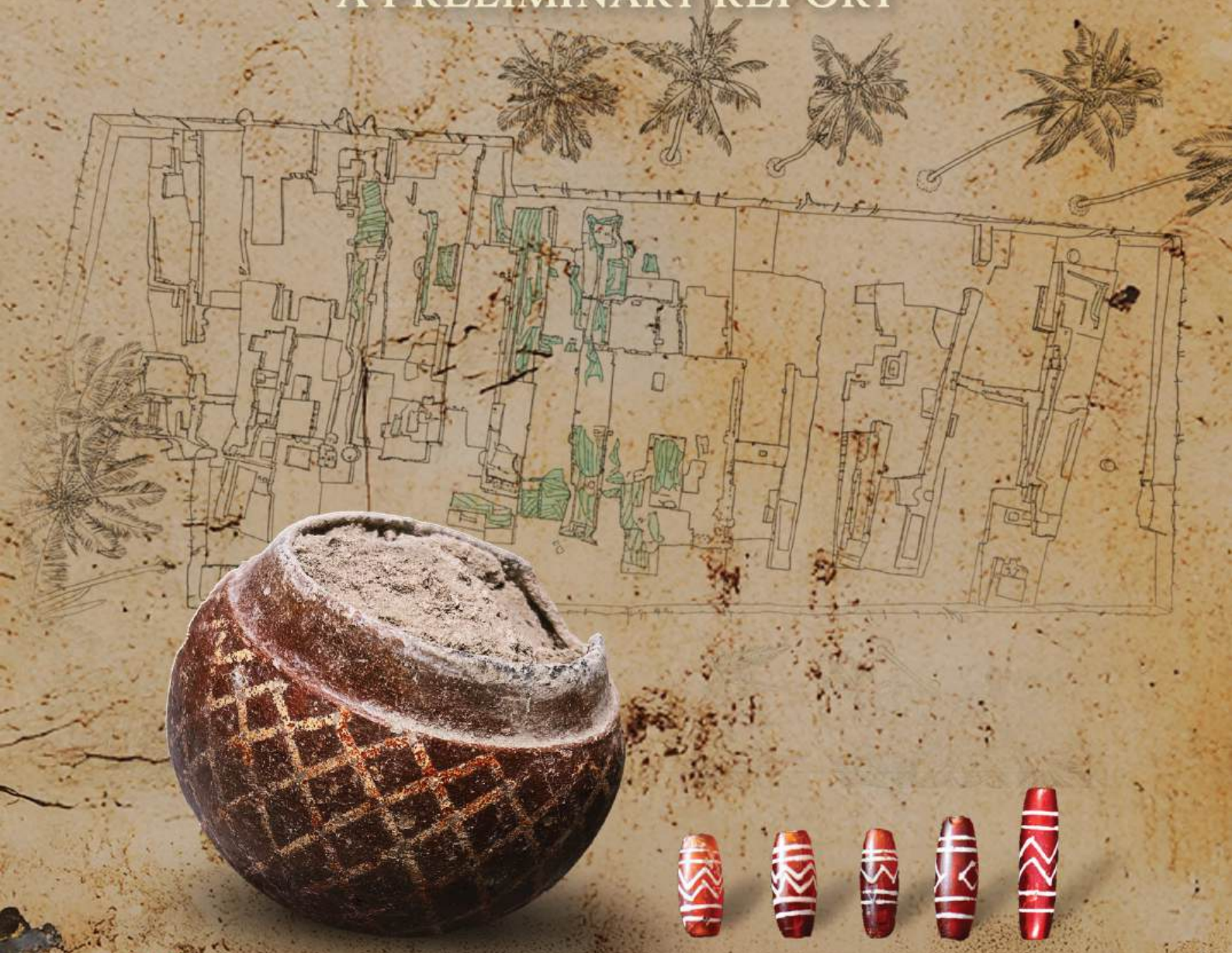
ARCHAEOLOGICAL EXCAVATIONS IN TAMIL NADU

A PRELIMINARY REPORT



GOVERNMENT OF TAMIL NADU
DEPARTMENT OF ARCHAEOLOGY

Archaeological Excavations in Tamil Nadu

A Preliminary Report

Editors

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Government of Tamil Nadu

Department of Archaeology

2025

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THANGAM THENARASU

Honourable Minister for Finance, Environment &
Climate Change and Archaeology

Foreword

Archaeology is a scientific discipline that reconstructs human past life based on material remains recovered from systematic excavations. In the initial stages of research, the focus was more on rebuilding the cultural history of India in chronological order. Over time, it has become increasingly realised that mere material interpretation is inadequate to reconstruct past human life, as the surroundings control and guide life. The environment, eco-settings, resources, and the level of technology achieved, modified, and adopted by our ancestors had a profound effect on the nature of their cultural, political, and economic growth. Therefore, archaeologists have started looking for scientific data from various disciplines to interpret the story of humans more effectively and efficiently. The necessity of an interdisciplinary approach to the subject due to the multifaceted growth of science and technology and its usefulness in interpreting the material remains is increasingly realised. A multidisciplinary approach adopted in archaeological research progressively invited other subject experts in the fields of language, literature, linguistics, anthropology, metallurgy, archaeozoology, palaeobotany, biotechnology, aDNA, and many other related areas to interpret the material remains in a more meaningful and resourceful manner.

The Tamil Nadu State Department of Archaeology embarked upon reconstructing the socio-economic and cultural life of the Tamils through intensive explorations and excavations. It has identified a vast vacuum that has existed throughout the long history of Tamil Nadu. To fill the cultural gaps, well-planned systematic excavation programmes were planned to uncover the cultural wealth of each cultural zone by identifying potential archaeological sites. The well-structured excavation programme tries to cover the entire Tamil

Nadu in time and space. The excavation was undertaken at eight places in 2024-25 covering a vast geographical area. Chronologically, it covers the period from the Microlithic-Neolithic transition to the Medieval period. The excavations brought to light several invaluable artefacts and ecofacts that could provide new perspectives and interpretations to change our understanding towards the cultural history of the Tamil region.

I congratulate all the Directors of Excavations who earnestly synthesised their findings and placed them before the academicians and the public for their observations. My heartfelt thanks to all the team members who were involved in the excavations 2024-2025. For the first time, the Tamil Nadu State Department of Archaeology has brought such preliminary reports of all excavated sites before going to the next season of excavation. I wish to congratulate the editors K.Rajan, R.Sivanantham, and V.P.Yathees Kumar, who consolidated the entire data and shaped the preliminary report, *Archaeological Excavations in Tamil Nadu.*

T. UDHAYACHANDRAN, I.A.S.,
Principal Secretary to the Government of Tamil Nadu
Finance Department and Commissioner of Archaeology

Foreword

Archaeology is a scientific discipline that involves reconstructing human past life, based on material remains recovered from systematic excavations. Excavation is the scientific way of uncovering and recovering artefacts, ecofacts, and stationary features that later cultural deposits have concealed. It involves the removal of the superimposed layers one by one in reverse order, gradually revealing successive cultural stages ofthe site's history. The excavation must be carried out methodically and meticulously so that the material evidence found can be seen and studied within its context. It is necessary to maintain a constructional record to understand the contextual and stratigraphical position of objects and architectural features, so that their relationship with the ancient environment could be established.

An archaeological excavation is usually complicated, time-consuming and financially demanding. There are many reasons for carrying out archaeological excavations and most of the excavations are being executed to fillthe cultural gaps and understand the unclear hypotheses or conclusions that revolve around the past life of humans. Successful archaeological excavation requires flexibility and open-mindedness which can be achieved by employing an interdisciplinary approach through various sciences and technologies. As Sir Mortimer Wheeler said, "The experienced excavator, who thinks beforedigs, succeeds in reaching his objective in most cases". Thus, a well-planned excavation with clear objectives could be the base for any successful excavation. In the year 2024-2025, the Department executed the excavations at eight archaeological sitesto construct an authentic cultural history of the region and each site is unique in its own way. Sites like Thirumalapuram

yielded, a unique cist burial, the largest of its kind in India. Chennanur exhibits a continuous cultural phase from the Mesolithic to the Medieval Period. Kilnamandi becomes the first site in Tamil Nadu with a dated sarcophagus, 1692 BCE. Kongalnagaram exhibits systematic excavation of menhirs in the region. These discoveries provide insights into different cultural periods that either support the earlier understanding or provide a new hypothesis to interpret the past of Tamil Nadu. The important artefacts unearthed in each excavation and the archaeological data gathered carefully were consolidated and placed before the academic community for their rigorous scrutiny. This preliminary report, *Archaeological Excavations in Tamil Nadu,* is brought to the fore within a short period. I do hope this trend-setting will continue in the coming years.

I congratulate the editors K.Rajan, R.Sivanantham and V.P.Yathees Kumar and all the Directors of the Excavations and their team members for taking earnest efforts to bring out the monograph efficiently and elegantly. I wish them all success in their future endeavours

Preface

Archaeological excavations are being carried out throughout the world with the intention of understanding and filling the cultural gaps that exist in the long history of a nation. In the initial stage of research, the primary purpose of archaeological excavation is to systematically uncover, document, and study material remains from past human activities in order to understand human history and culture. In essence, archaeological excavation is about extracting information about past human lives from the material remnants they left behind. This careful and systematic approach allows archaeologists to reconstruct histories, understand cultural developments, and preserve our shared heritage for future generations. In the course of time, the purpose is extended to the extent that how ancient people interacted with their environment, adapted to changes, developed technologies, and practised their beliefs and rituals. Archaeologists try to understand the cognitive properties of human behaviour based on tangible and intangible evidences. The ethnic identity and territorial integrity are slowly penetrated into the archaeological investigations to prove or disprove the very existence of the society. In the Indian context, the language played a crucial role in controlling the geographical entity and in recent years, aDNA started taking its position through cutting-edge research in sciences. Science plays a vital and increasingly important role in reconstructing the past, especially in the field of archaeology. It provides archaeologists with powerful tools and methodologies to extract information from material remains that traditional methods alone cannot yield. The physical and biological sciences started dominating the archaeological research as they brought to the fore new dimensions to the archaeological research,and they solvedmany unsettled issues. Human migration and its subsequent economic, social, political, and linguistic dominance regulate society to unravelits history to establish and re-establish its identity in the domain of language and culture. In summary, scientific advancements have become an indispensable part of archaeological research, offering methods to date finds, discover hidden sites, reconstruct past environments and diets, and analyse artefacts and human remains in unprecedented detail. This interdisciplinary approach allows for a richer and more accurate reconstruction of the human past, deepening our understanding of ancient cultures, economies and societies.

The persistent and determined demand of the society and the nation compelled current administrators and archaeologists to launch a programme that fulfil the aspirations of contemporary society and also guides the future generation to grow as receptive and responsible citizens.The Tamil Nadu State Department of Archaeology planned a well-structured and target-oriented excavation programmes covering spatially the entire stretch of the state and chronologically the entire cultural periods so as to reconstruct the cultural history of Tamil Nadu in a more meaningful and purposeful manner. The excavations were carried out at eight sites covering from Prehistoric times to the historical period. Each excavation is unique in its way and provides considerable information to fill the cultural gaps of Tamil Nadu. The site Chennanur yielded the cultural horizon moving from microlithic to neolithic with an OSL date of 10,000 years. Urn burials placed within a rectangular enclosure were exposed for the first time in Tamil Nadu at Tirumalapuram, signifying the emergence of a kind of clan-based society during the Iron Age. The graffiti signs found on the urns stand as a unique opportunity for the archaeologists to estimate their chronological and cultural context. At Kilnamandi, the three stages of Neolithic tool production centres and their subsequent cultural transformation associated with sarcophagus burial within a pit or chambers were unearthed. For the first time, a radiocarbon date for graffiti mark was obtained in Tamil Nadu. The occurrence of Tamili inscribed potsherds unearthed at Marungur and the exposureof urn burials substantiate its earlier findings. Keeladi, the early historic urban centre, is further strengthened with more material evidence reflecting structural, trade and literary activities. Kongalnagram located on the ancient trade route displayed the position of russet-coated ware and also the nature of chamber tombs and their continuity in the early historic period. The continuity of the construction of forts and fortifications and its utility till today is well-exposed at Porpanaikottai. Thus, each archaeological site and each excavation programme revealed important cultural events, demonstrating the continuity and cultural prosperity. The present monograph attempts to highlight the cultural significance of each excavated site carried out in the year 2024-2025.

Acknowledgements

We would like to place on record our sincere thanks to the Director General, Archaeological Survey of India and the Standing Committee for granting timely permission to carry out excavations at eight places in Tamil Nadu during the year 2024-2025.

With immense pleasure, we gracefully and gratefully acknowledge with a profound sense of gratitude to Thiru. Thangam Thenarasu, Honourable Minister for Finance and Environment, Climate Change and Archaeology, Dr. K.Manivasan, IAS., Additional Chief Secretary to the Government of Tamil Nadu and Principal Secretary to Tourism, Culture and Religious Endowments Department and Thiru. T.Udhayachandran, IAS., Principal Secretary to the Government of Tamil Nadu Finance Department and Commissioner of Archaeology for the constant financial and administrative support.

We wish to express our appreciation to all the Directors and Co-Directors of the excavation and all the team members involved in excavationprogramme, directly and indirectly, for bringing the forgotten historical and cultural values of Tamil Nadu through their dedicated work in the field. All of them had enthusiastically and energetically served in the field and shouldered the responsibility of exploring and excavatingarchaeological sites with total dedication and determination. The successful completion of the fieldwork owes a lot to the excellent cooperative spirit displayed by the directors. Besides, several Research Scholars, Technical members and individuals participated passionately and served as the backbone of the excavation programme. Without their cooperative spirit, dedication and determination, the present monograph could not have seen the light of the day. We thank Dr.G.Muthu Sankar, French Institute of Pondicherry, for the excellent maps on excavated sites.

Above all, we thank all the village communities for the support, both logistic, moral and physical, during the excavation works.

Excavated Sites in Tamil Nadu (2024 - 2025)
77°E
78°E
79°E
80°E
13°N
12°N
11°N
10°N
9°N
8°N
Chennanoor
Kilnamandi
Marungur
Bay of Bengal
Tamil Nadu
Kongalnagaram
Porpanaikottai
Keeladi
Vembakottai
Thirumalapuram
Gulf of Mannar
Arabian Sea
Excavated Sites
N
W
E
S
Indian Ocean
0
50
100 km
Esri, Garmin, GEBCO, NOAA NGDC, and other contributors

x

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Excavations at Chennanur

S. Paranthaman
R. Venkataguru Prassana

Introduction

Chennanur (Lat. 12˚35'97" N; Long. 78˚51'55" E) is a small hamlet located about 50km south-east of Krishnagiri and 14km north of the Uttangarai taluk of Krishnagiri district. To approach this village, one has to travel about 43km southeast of Krishnagiri on Krishnagiri-Thiruvannamalai highways and take a diversion towards northeast at Samalpatti junction and proceed further 5km on Kallavi-Tirupathur road to reach the village Kunnathur. From Kunnathur, one has to travel 2km north on the Kunnathur-Kakangarai road to reach Chennanur and then exit on a right-side mud road that leads to a stretched hill range containing a Kanavai Mariyamman Temple at the top. The archaeological site at Chennanur lies onthe southwest slope of this hill range. One can also approach the Samalpatti junction by travelling about 7km northwest from Uttangarai on the Uttangarai-Krishnagiri highway and turning right at Samalpatti (Fig. 1.1)

The huge habitation mound at Chennanur covering an area of more than 50 acres of land is located at the foothill of the hill range locally named as *Chennanur guddai* (Fig.1.2). Notably, archaeological excavations have revealed cultural deposits ranging in depth from 2 to 3.80m across various trenches, providing a well-stratified context for understanding the site's occupational history and cultural transformations over time.

Geology

Chennanur site is strategically situated near natural water sources, which likely played a crucial role in selecting this location for habitation. Approximately 500m west of the site's western periphery, the river Pambar flows, serving as a reliable water source for both domestic, cattle raising and possibly ritual activities in the past. In addition to the main river, a few small seasonal streams have been identified, originating from the slope of the hill behind the habitation mound. Though now dry, this stream likely carried runoff during the monsoon season, contributing to local water availability in earlier periods. Several boulders contain natural water-stagnation depressions, where rainwater collects and remains trapped for extended periods (Fig.1.3). These naturally occurring rock-cut basins would have served as additional water sources, particularly in dry seasons and may have had utilitarian purposes. Their widespread presence further underscores the ecological suitability of Chennanur for sustained human occupation.

Together, these features point to a landscape that was not only archaeologically rich but also environmentally favourable, with multiple, accessible water sources supporting life across various cultural phases at the site.

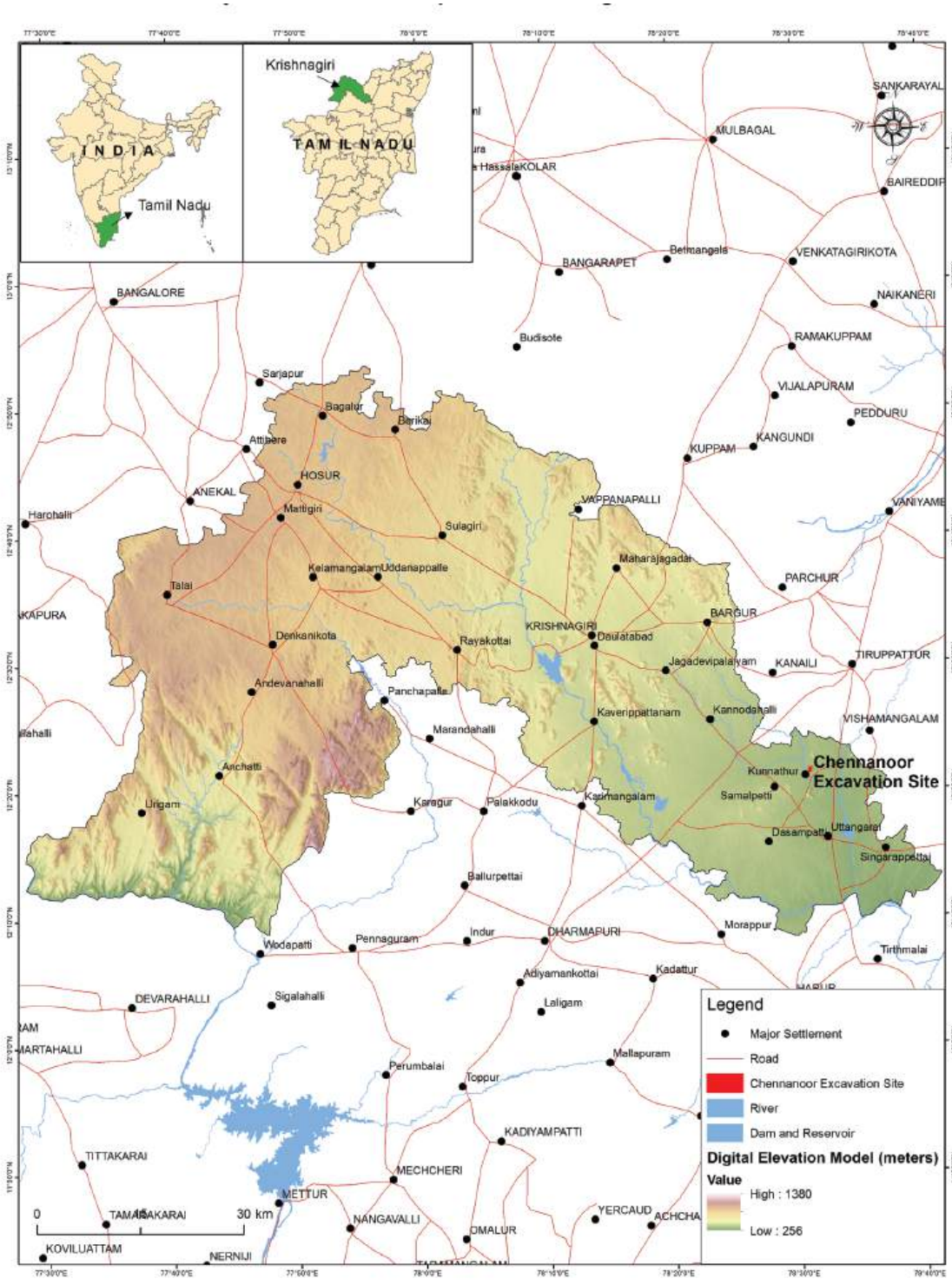

Fig.1.1 Chennanur: Location of the site

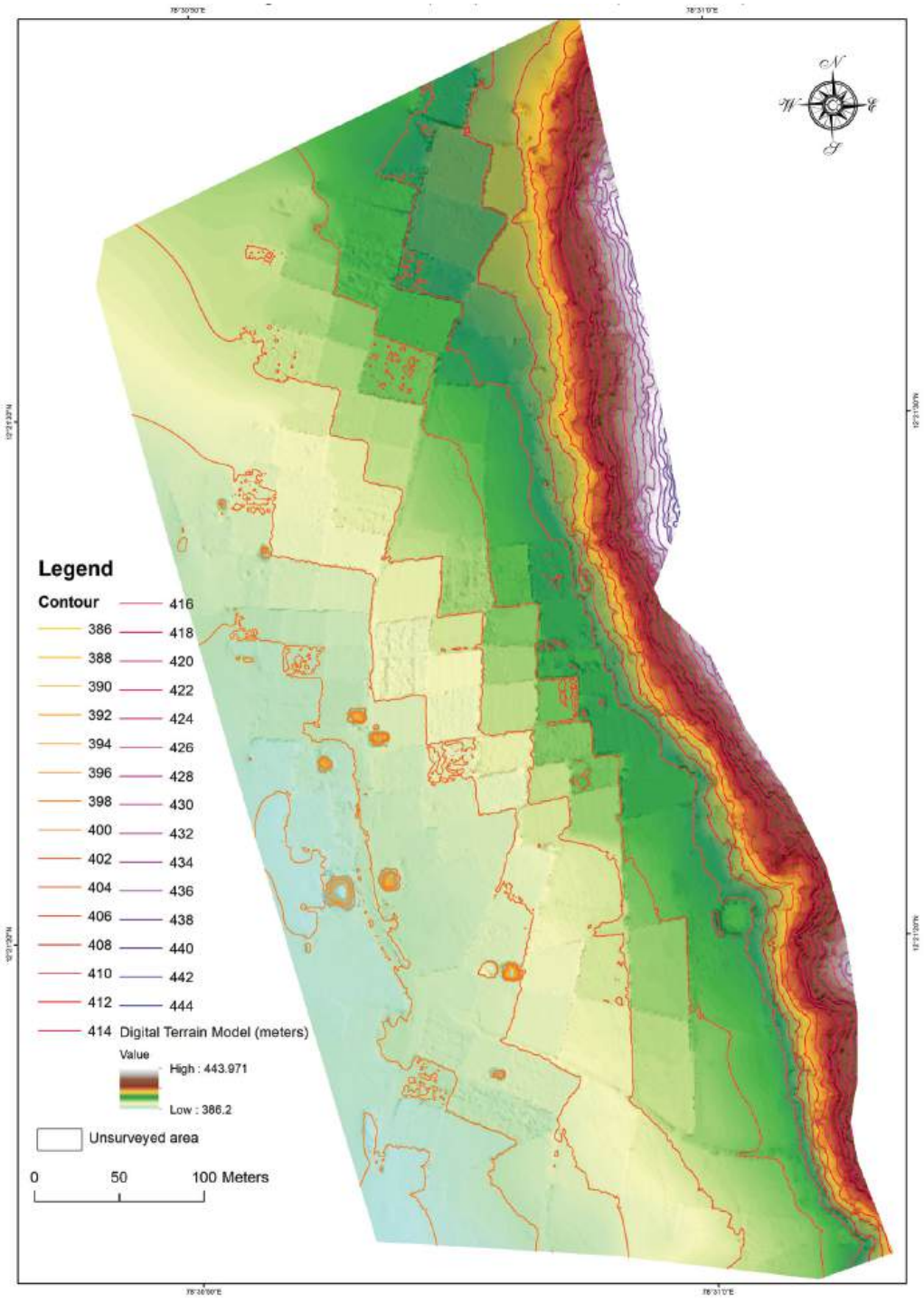

Fig. 1.2 Chennanur: Habitation site contour map

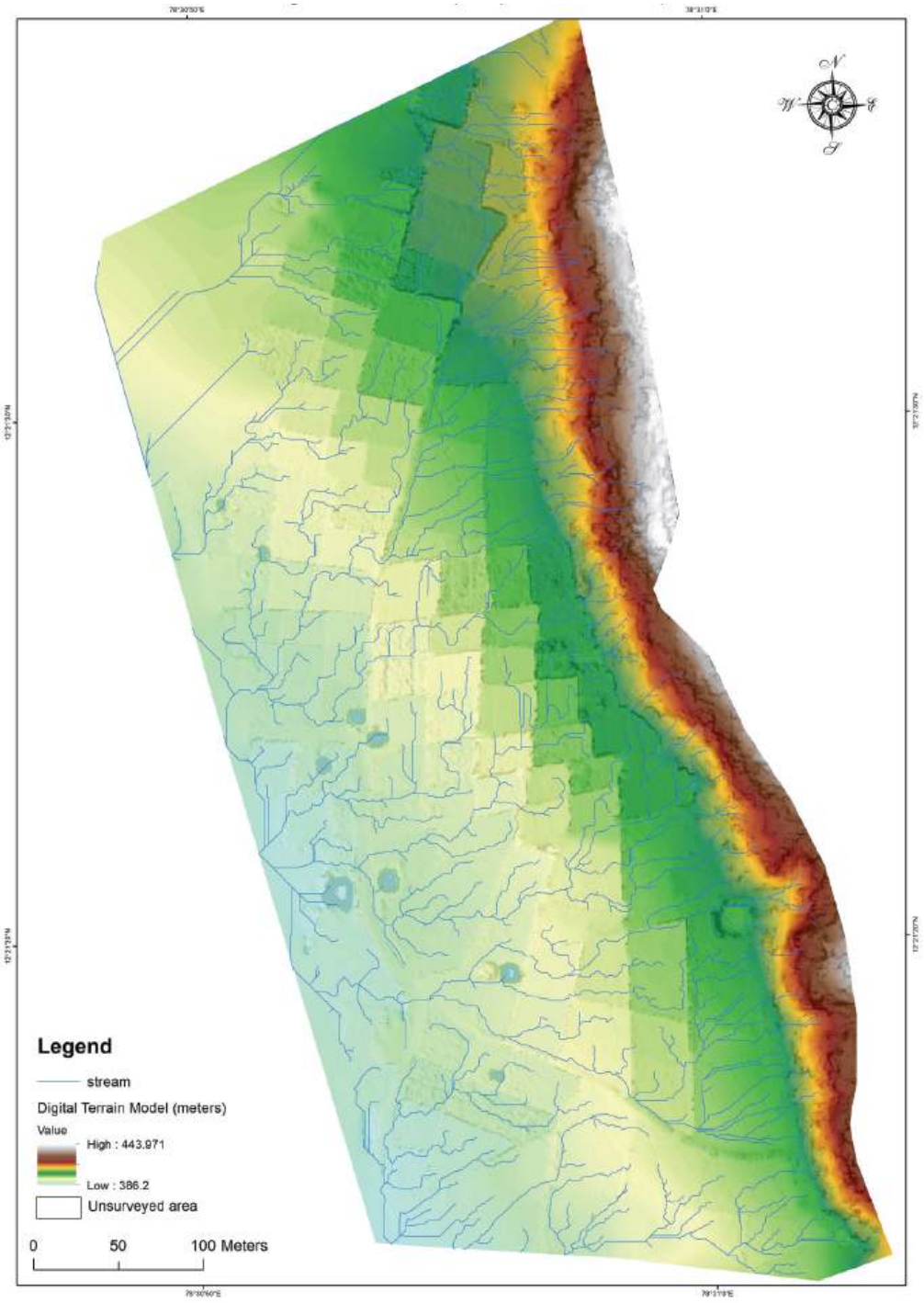

Fig. 1.3 Chennanur: Drainage system and river flow pattern of the site

Historical significance

The archaeological site of Chennanur, located on the western slope of the hillock known as *Chennanur guddai* (Fig.1.4), represents a site of exceptional cultural and historical value. This site contains a large habitation mound indicative of prolonged human occupation, ranging from prehistoric to early medieval periods. The archaeological evidence discovered here contributes significantly to our understanding of early human settlement patterns, rock art traditions, lithic technologies and evolving religious practices in this region.

Fig. 1.4 Chennanur: General view of the habitation site

Microlithic cores and Polished stone tools

Microlithic core tools made of chert were identified during surface exploration. These artefacts suggest early human activity and tool-making traditions in the region. Their presence adds a prehistoric dimension to the site's cultural sequence. Numerous celt tools in full shape and broken are scattered across the site, suggesting a Neolithic or an early Iron Age component to the occupation. These stone tools are likely used for clearing vegetation, processing food or crafting other implements, indicating a settled or semi-sedentary lifestyle supported by tool-based economies.

Rock Shelter–1

One of the most striking features of the site is the series of rock shelters found in and around the hillock. A rock shelter has been identified on the western slope of the hill, bearing rock paintings in white ochre. Surface collection in and around the shelter yielded several artefacts, including a broken spindle whorl, a fully intact terracotta hopscotch and a large quantity of potsherds. These finds

strongly suggest that excavation within the shelter may uncover crucial evidence of the earliest human settlement in this region. The entire western slope of the hill range is characterized by massive boulders and rock ridges (Fig.1.5). The rock paintings include a range of motifs: geometric symbols, natural elements such as the sun and moon and a human figure (Fig.1.6) depicted in stylistic forms. A recurring and prominent motif across all three sites is the trishul-like (trident-shaped) symbol, which appears frequently. In addition, an inverted trishul is also present in the composition (Fig.1.7). Significantly, this inverted trishul symbol has also been observed as a graffiti mark inscribed on red-slipped pottery, establishing a symbolic connection between the rock art and associated material culture.

Fig.1.5 Chennanur: General view of rock shelter – 01

Fig.1.6 Chennanur: Painting in white ochre at rock shelter - 01

Fig. 1.7 Chennanur: Painting in white ochre at rock shelter - 01

Rock Shelter–2

Several paintings have been observed on the roof of the rock shelter (Fig.1.8). Among them are human figurines depicted in various forms, including stylized postures and diverse body outlines. Notably, two animals standing side by side, along with a bird and several ambiguous images that may represent unidentified weapons. A prominent *trishul* (trident) like motif is visible, with a few irregular geometric symbols scattered across the surface.

Another rock painting, discovered on a nearby boulder, features three human figures with curved arms and legs, clearly defined heads and a dynamic posture. Additionally, five more human figures are illustrated with squared arms and legs, suggesting a possible symbolic or stylistic differentiation. One particularly intriguing figure appears to represent an unidentified creature: it has a beaked nose, conical head, two human-like arms and legs with a long, tail-like projection at the front of the body. This figure is positioned in what appears to be a combat stance against an animal standing opposite it, possibly indicating a mythical or ritualistic scene.

Within the same panel, *trishul* and inverted *trishul* symbols are also present. An animal figure, possibly a deer, is identifiable, adding to the diversity of fauna depicted. Interestingly, some paintings rendered in white pigment have been superimposed over earlier white red figures, suggesting that the red pigment

paintings are of an earlier phase. At the corner of the boulder, a dotted peacock, stylistically distinct and belonging to a later artistic phase, can be observed (Fig.1.9).

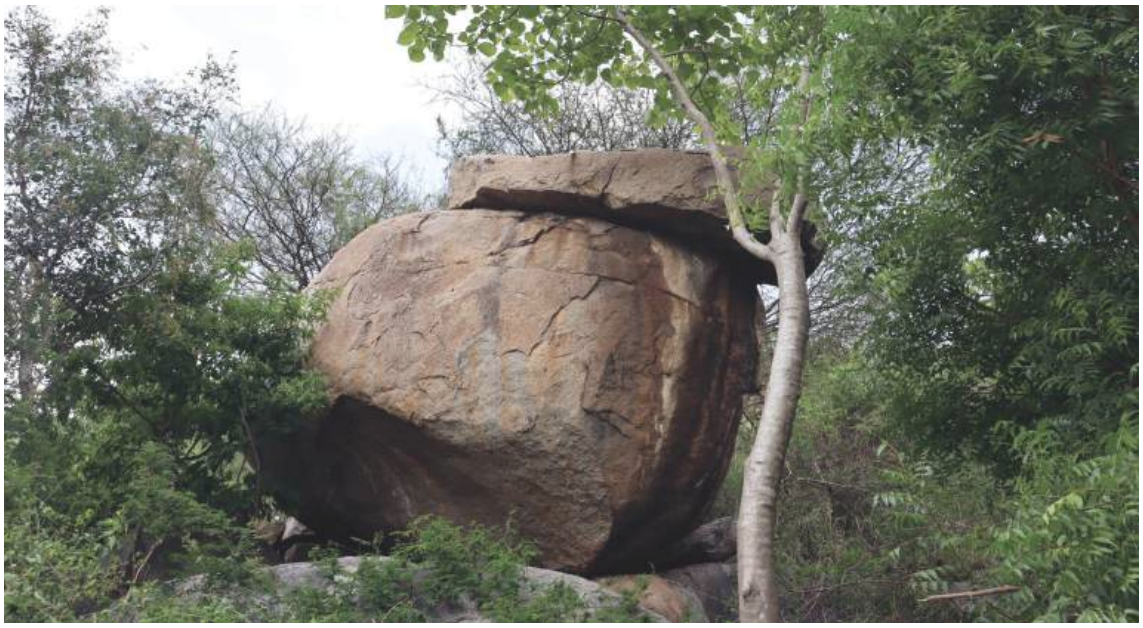

Fig. 1.8 Chennanur: General view of rock shelter - 02

Fig. 1.9 Chennanur: Painting in white ochre at rock shelter - 02

Rock Shelter–3

Approximately 800m north-west of the main habitation mound, yet another rock painting in a boulder has been recorded (Fig.1.10). This location, too, bears paintings in white ochre, further reinforcing the ritual or communicative importance of rock surfaces in the earliest cultural landscape. Human figures with curved arms and legs, clearly defined heads and a dynamic posture are noticed with an inverted trident. Most of the paintings were overwritten by modern-day activities. White ochre paintings include human figurines, geometrical symbols and other natural elements (Fig.1.11). Currently, the boulders in this area are being quarried by the villagers to prepare the land for cultivation.

Fig. 1.10 Chennanur: General view of rock shelter – 03

Fig. 1.11 Chennanur: Painting in white ochre at rock shelter – 02

Sangam Age bricks

Interestingly, Sangam Age bricks, characterized by their size and composition, have been reused in modern boundary constructions. This indicates that early historical architectural materials were durable and locally sourced and their reuse highlights the living connection between ancient and contemporary communities.

Stone Sculpture-Durga

Approximately 1.5km from the site, ruins of a temple containing broken pillars and their components, a pedestal, stambs and their components have been identified. Among the ruins, a Durga image bearing an inscription is placed on a pedestal, further strengthening the site's religious and historical significance during the medieval period (Fig.1.12). The presence of religious artefacts from both Vaishnavite and Shakta traditions suggests an evolving religious landscape over time.

Fig. 1.12 Chennanur: Stone image of Goddess Durga

Stone Sculpture-Vishnu

The site also yields strong evidence for continued or renewed occupation into the early historic period, especially during the Pallava era. A stone sculpture of Vishnu, located near the habitation mound, attests to the early spread of Vaishnavism in the region (Fig.1.13). The stylistic features of this sculpture align with Pallava iconography and religious expression.

Fig. 1.13 Chennanur: Stone image of Lord Vishnu

Fig. 1.14 Chennanur: Herostone with Vatteluthu inscription

Herostone - 1

Several herostones were identified around the habitation site at Chennanur. Of particular note is a hero stone inscribed in *Vatteluthu* script, providing valuable epigraphical evidence (Fig.1.14). Herostones were erected in memory of warriors who died in a skirmish/battle as an act of heroism.

Herostone – 2

Additionally, a herostone, located south-west of the habitation site, depicts a man in combat posture holding a long spear in his right hand and a shield in his left. The details about the weapons are a wonder of the work of sculpture. The hero wears a top knot on his head with lower garments. The spearhead and shaft are separated and the shield contains the floral design. The scene commemorating acts of bravery involving wildlife, is a motif occasionally seen in South Indian herostone tradition (Fig.1.15).

Fig. 1.15 Chennanur: Herostone with spear and shield

The Chennanur site presents a multi-cultural archaeological landscape, from prehistoric to medieval through early historic periods. It is rare to encounter a site with such a range of archaeological and historical features, such as rock art, habitation mounds, tools, inscriptions, sculpture, temple ruins and herostones, all within proximity.

Previous investigations

The archaeological site Chennanur (Kunnathur village) was first documented by K. Rajan in 1997, marking the initial recorded exploration of the area. During his investigations, he identified evidence pointing to a burial site, suggesting that Chennanur may have been a significant settlement in the past. He also noted that more than 50 cairn circles were noticed adjacent to Kunnathur Higher Secondary School. Since then, much of the surrounding land has been cleared and prepared for cultivation. The discovery of habitation remains alongside burial features indicates a complex social structure and long-term occupation, underscoring the importance of the site's archaeological significance.

Present Excavations

The archaeological vestiges identified around the Chennanur area indicate a rich and promising potential for systematic excavation. Surface findings suggest that the region holds significant cultural deposits that can shed light on the historical and socio-cultural development of the area. The diversity and density of material remains point to the likelihood of continuous human occupation and a well-organized settlement pattern. Excavation in this region is expected to reveal valuable insights into the cultural characteristics, technological advancements, trade activities and subsistence strategies of past communities. Given its potential, the Chennanur area warrants detailed archaeological investigation to reconstruct the region's cultural sequence and better understand its historical relevance.

Habitation cuttings

During the exploratory survey, the habitation mound was observed to exhibit a multi-layered occupation, deserving large-scale horizontal excavation. The habitation mound is systematically divided into workable localities to ensure better understanding and sufficient trench intervals during excavation. At Chennanur, the mound has been classified into two distinct localities based on topographical and archaeological evidence. This helps manage large or topographically complex mounds and the locality boundaries are based on visible natural features such as rock shelters, slopes, ridgelines and similar landmarks. Likewise, Locality-I extends from Rock Shelter-1 (locally called *Ragupathi gundu*) and continues southward up to Rock Shelter-2. The Locality-II begins from Rock Shelter-2 and stretches further southward towards the hill.

It is decided to establish a grid system for the entire mound, with each grid measuring 5m x 5m, to maintain continuity and preserve the contiguous nature of the mound. A datum point was fixed from the *Ragupathi Gundu* (rock shelter-1) located on the northern slope of the hillock, at the eastern side of the habitation site.

Fig. 1.16 Chennanur: General view of Locality – 01

Fig. 1.17 Chennanur: General view of Locality - 02

Currently, excavation work has been conducted in both localities. In Locality -I, 14 trenches were excavated that include A2, B2, C2, B3, C3, B4, C4, E6, I2, Z7, ZC3, ZD4, ZU3 and ZV2 (Fig.1.16). In Locality - II, 7 trenches A1, C1, B3, A3, A4, YP5 and YQ5 have been laid out (Fig.1-17). Additionally, two trenches, T-1 and T-2, were positioned within the rock shelter of the Locality–I. In total, 23 trenches were laid to understand the cultural sequence and their spread.

Trench Description

Locality	Trench number	Location	Cultural sequence (depth in cm)	Stratigraphic layers
Locality 1	A2	South of zero peg	249	5
Locality 1	B2	South of A2	323	
Locality 1	C2	South of B2	228	5
Locality 1	B3	Immediate east of B2	246	5
Locality 1	C3	Immediate east of B3	275	5
Locality 1	B4	East of B3 & immediate north of C4	230	5
Locality 1	C4	Immediate south of B4 & east of C3	246	5
Locality 1	E6	South east of C4	254	5
Locality 1	I2	South of C2	291	5
Locality 1	Z7	southern periphery of the site	295	5
Locality 1	ZC3 & ZD4	North of A3	368 & 312	8
Locality 1	ZU3 & ZV2	North of A3	215 & 189	5
Locality 1	01 & 02	Inside the rock shelter	160	3
Locality 2	A1, A3, A4, B2 & C1 (cluster)			5
Locality 2	YP5 & YQ5	North of A4		5

Locality – 1

Trench - A2

Trench A2, measuring 5m × 5m with a total depth of 249cm, is south of the zero peg. The excavation revealed a precise cultural sequence across five major stratigraphic layers. The uppermost humus layer, consisting of loose pale grey soil, showed signs of recent human activity and contained modern materials.

Beneath this, a pale brown semi-hard deposit yielded early historic material including Black-and-Red Ware (BRW), Red Ware (RW) and Red Slipped Ware (RSW) pottery, along with terracotta objects, a shell bangle piece and glass artefacts. This was followed by a dark brown compact soil with mixed clay, silt and sand-assigned to the Iron Age-yielding BRW, RW, RSW, scanty burnished ware and iron implements like nails and rusted blades. At 85cm, a prepared lime-coated floor was uncovered, composed of clay, pottery chips and stone fragments, indicating a built surface. Below this, a transitional layer between the Neolithic and Iron Age displayed attributes from both phases, including burnished ware, broken celts, dolerite cores and signs of pit activity. Below, a pale reddish-brown deposit represented the Neolithic phase, yielding burnished ware, coarse red ware, terracotta spindle whorls and shell bangles. Numerous charred animal bones were recovered, particularly concentrated in this layer, suggesting domestic activity. The lowest cultural deposit comprised dark reddish-brown, gravel-rich soil containing microlithic blade tools, flakes and cores, marking an earlier Mesolithic phase. Excavation terminated at a natural orangey-yellow murrum layer with regolith formation, signifying sterile soil.

Trench – B2

Trench - B2, measuring 5m × 5m with a total depth of 323cm, lies immediately south of Trench A2. The topmost layer consisted of pale grey, loose humus soil, disturbed by modern agricultural activity. This was followed by a pale brown semi-hard deposit associated with early historic occupation, containing BRW, RW, RSW potteries, terracotta fragments, glass pieces and shell bangles. A subsequent compact dark brown clay-silt-sand layer belonged to the Iron Age, with abundant BRW and RSW pottery and iron implements such as nails and rusted blades. Below this, a transitional deposit reflecting a shift from the Neolithic to the Iron Age revealed mixed cultural traits—burnished ware, dolerite cores and broken celtsalong with multiple pit features. The following layer, pale reddish brown in colour, yielded only Neolithic antiquities such as terracotta spindle whorls, burnished and coarse red ware and shell bangle fragments. A notable feature was a cluster of disturbed stone rubble in the lower Neolithic level. Although the structure could not be fully identified due to disturbance, polished stones were retrieved from within the rubble, indicating some form of structural or activity area. Animal bones were found across all

layers, with a higher concentration of charred specimens in the Neolithic phase, suggesting domestic use and food preparation. The lowermost cultural layer consisted of dark reddish-brown gravelly soil containing microlithic blade tools, flakes andcores, marking an earlier phase of occupation. Beneath this, natural orange-yellow murrum with regolith was encountered.

Trench – C2

Trench C2, located immediately south of Trench - B2 and west of Trench - C3, measured 5m × 5m and reached a depth of 228cm.Excavation revealed five distinct cultural layers. The topmost pale grey humus showed recent disturbance. Below it, a pale brown deposit contained early historic pottery types like BRW, RW, and RSW, along with terracotta objects and glass and shell ornaments.

The third layer, a compact dark brown clay-silt-sand mix, was assigned to the Iron Age and yielded iron tools and pottery of fine and coarser BRW, RW, RSW. A transitional layer followed, with mixed Iron Age and Neolithic traits, including burnished ware, broken celts, dolerite cores and pit activity. The Neolithic level consisted of pale reddish-brown soil with spindle whorls, burnished and coarse red ware and shell bangles. The basal layer revealed microlithic blade tools and flakes in dark reddish brown gravelly soil, ending in sterile orange-yellow murrum. Charred animal bones were frequent, especially in the Neolithic layer, indicating domestic activity.

Trench - B3

Trench - B3, located immediately east of Trench - B2, measured 5m × 5m and was excavated to a depth of 246cm.The trench revealed five significant cultural deposits, beginning with a disturbed pale grey humus layer due to modern-day activity. A pale brown deposit followed, associated with early historic material including BRW, RW, RSW pottery, along with a few russet coated painted ware and artefacts like shell bangle pieces and glass bangle pieces mostly in black colour. The third layer, compact dark brown soil, yielded Iron Age pottery and iron tools like nails, a rusted broken knife and unidentified objects. Below, a transition layer contained mixed Neolithic-Iron Age traits, with broken celts and pit features. The Neolithic deposit consisted of reddish-brown soil with spindle whorls, coarse red ware and shell bangles. Excavation reached sterile orange-yellow murrum. Animal bones occurred throughout, with charred fragments concentrated in Neolithic levels. The final cultural deposit had microlithic cores, blade flakes in quartz and a gravelly matrix.

Trench - C3

Trench - C3, situated east of Trench - C2 and south of Trench - B3 was excavated to 275cm, exposing a similar five-layer cultural sequence. The top layer was loose, pale grey humus with signs of modern intrusion. Next, a pale

brown deposit yielded early historic ceramics and minor antiquities, the third layer comprised compact dark brown clayey silt, rich in Iron Age pottery and iron implements. A transitional deposit beneath this showed Neolithic and Iron Age overlap, containing broken celts, burnished ware, shell bangle pieces and pit activities. The Neolithic layer yielded reddish brown soil with terracotta spindle whorls and shell bangle pieces. Animal bones were abundant and signs of burning were evident in the Neolithic layer. Microlithic activity was noted in the basal gravelly deposit. The trench was completed in natural murrum soil.

Trench - B4

Trench - B4, lying directly east of B3 and immediately north of Trench - C4, was excavated to a depth of 230cm and presented a consistent five-layer sequence. The upper pale grey humus was disturbed by recent cultivation activity. A pale brown deposit followedby early historic pottery types and artefacts like terracotta beads, hopscotches, spindle whorl, iron objects and glass fragments. The second layer of compact dark brown soil contained Iron Age pottery and corroded iron implements with potteries like BRW, RW, RSW and a few russet- coated painted ware. At a depth of about 85cm two pots, one with a conical base and another with a round base are noticed. The size of the pot is about 35cm high. The transitional third layer revealed a mix of Neolithic and Iron Age traits, like terracotta hopscotches, spindle whorl, shell bangle pieces and pit activity. Charred bones were frequent in Neolithic contexts.The Neolithic deposit beneath this consisted of pale reddish-brown soil with spindle whorls and shell bangles. The gravel-rich basal layer noted a microlithic tool with quartz cores and flakes. Natural murrum deposit is noticed all over the trench below.

Trench - C4

Trench - C4, located immediately south of Trench – B4 and directly east of Trench - C3, was excavated to a depth of 246cm and revealed a five-layer stratigraphy. The top pale grey humus layer was loosely packed, showing modern agricultural disturbance. Beneath it, a pale brown semi-hard deposit yielded early historic ceramics like BRW, RW and RSW along with terracotta objects and shell bangle pieces. The third layer was compact and dark brown, belonging to the Iron Age, with pottery and iron implements such as nails and rusted tools. A transition layer was noted between the Iron Age and Neolithic, with mixed pottery types, dolerite cores and pits. Below that, the Neolithic layer revealed reddish brown soil with burnished ware, coarse red ware, spindle whorls and shell bangles. The trench reached the microlithic deposit with quartz cores and flake tools in a gravelly deposit and finally hit a sterile orange-yellow murrum deposit.

Trench - E6

Trench - E6, situated 25m south-east of Trench C4 is towards the eastern side of the site, measuring 5m × 5m and reaching a depth of 254cm.The stratigraphy showed five layers beginning with pale grey humus disturbed by surface activity. A pale brown layer followed by early historic pottery and small artefacts including terracotta hopscotches and bangle pieces in shell and glass. The second layer was dark brown, compact and contained Iron Age pottery, nails and other corroded iron tools. A complete skeleton structure without skull of a cow or buffalo is noticed at a depth of about 145cm in association with a full-shaped pot at the northern section was found intact. A transitional phase came next with mixed Neolithic-Iron Age traits, including burnished ware, dolerite cores and signs of pit activity. The Neolithic deposit consisted of reddish-brown soil yielding spindle whorls, burnishing tools, shell bangles, coarse red ware potteries and burnished ware. Animal bones, especially charred ones, were concentrated in the Neolithic level, suggesting cooking or domestic use. Microlithic tools were recovered from the basal gravelly layer. The trench ended in natural murrum.

Trench - I2

Trench - I2, located 25m south of C2 and in the central part of the site, reached a depth of 291cm and exposed a sequence of five cultural layers. The surface pale grey humus layer showed signs of recent disturbance. The pale brown layer yielded early historic pottery and artefacts in shell and terracotta. The next, compact dark brown layer belonged to the Iron Age and contained BRW, RSW, painted red ware and iron artefacts. A mixed cultural layer followed, showing both Iron Age and Neolithic with burnished ware, burnishing tools, dolerite stone tools and firing activities. At a depth of 174cm, a rusted iron plate and a fragile object are identified. The Neolithic layer consisted of reddish-brown soil with shell bangles, coarse ware and spindle whorls. Microlithic tools and cores were found in the lower most gravelly deposit. Natural soil began as orange-yellow murrum with regolith.

Trench – Z7

Trench - Z7, located on the southern periphery of the site, was excavated to a depth of 295cm and displayed a precise five-layer stratigraphic sequence. The top layer consisted of pale grey loose humus, disturbed by recent surface activities. A pale brown deposit followed, yielding early historic ceramics such as BRW, RW and RSW, along with terracotta and glass artefacts. The second layer was compact and dark brown, with Iron Age pottery, burnishing tools and rusted

iron tools. A transitional layer marked the shift from the Iron Age to the Neolithic, with mixed cultural materials like burnished ware, shell bangle pieces and dolerite cores. Charred animal bones were especially more noted in Neolithic contexts, suggesting food preparation activity. The Neolithic deposit beneath featured reddish brown soil with spindle whorls, shell bangles and coarse red ware. The lowest cultural level revealed microlithic tools of blades and flakes embedded in gravelly soil. Natural murrum with regolith was reached at the base.

Trench – ZC3 and ZD4

Trenches ZC3 and ZD4, located 15m north of A3, measured 5m × 5m and reached a depth of 368cm and 312cm respectively, revealing an eight-layer stratigraphic sequence. The upper two layers were associated with the Early Medieval and Medieval periods, consisting of compact greyish brown soil with occasional medieval pottery and roof tile fragments. Below, a pale brown deposit yielded early historic pottery types like BRW, RW and RSW along with terracotta objects. In trench ZC3 at 115cm depth, firing activity is noticed with a few charred seeds, probably jackfruit were recovered, indicating food processing or storage. Underneath the activity, a notable pit feature lined with a clay-packed wall suggests intense firing activity is noticed. The next layer is dark brown and compact, representing the Iron Age with iron implements and ceramics. A transitional layer beneath contained both Iron Age and Neolithic features, including dolerite cores and burnished ware. The Neolithic level revealed reddish brown soil with spindle whorls, coarse ware and shell bangles. Below this, a microlithic-rich gravelly layer was encountered. A pit went deep into the natural soil at the western section of Trench - ZD4. Excavation at both trenches reached an orange-yellow murrum deposit.

Trench – ZU3 and ZV2

Trench - ZU3 and ZV2, located 125m north of Trench - A3 and it is towards the northern side of the site, measuring 5m × 5m and reaching a depth of 215cm and 189cm respectively. In both trenches, stratigraphy showed five layers beginning with pale grey humus disturbed by surface activity. A pale brown layer followed by early historic pottery and small artefacts including terracotta hopscotches and bangle pieces in shell and glass. The second layer was dark brown, compact and contained Iron Age pottery along with nails and other corroded iron tools. At ZU3, a full-shaped red ware closed with a dish is noticed in the southern section at a depth of 130cm.A transitional phase came next with mixed Neolithic-Iron Age traits, including burnished ware, dolerite cores and signs of pit activity. In trench ZV2, at a depth of about 147cm, a pottery cluster is identified at the south-west corner section of the trench. The Neolithic deposit consisted of reddish-brown soil yielding spindle whorls, burnishing tools, shell bangles, coarse

red ware potteries and burnished ware. Animal bones, especially charred ones, were concentrated in the Neolithic level, suggesting cooking or domestic use. Microlithic tools were recovered from the basal gravelly layer. The trench ended in natural murrum.

Trench – 01 and 02

Two trenches named Trench -01 and 02 are laid inside the rock shelter. The measurements of Trench 01 are 2m X 2.25m and are marked at the centre of the shelter. The excavation reveals a 160m cultural deposit starting from the Iron Age cultural associates and continuing up to the medieval phase. Potsherds like a lid-cum-bowl are scattered around the shelter and the hill slope. The large quantity of this ware might denote ritual practice should have been performed in this shelter. From the excavation, tiny red ware and black-and-red ware were collected in very scanty amounts. The shelter reached its bedrock at 165 cm.

Locality - 02

At locality – 02, a totalof 07 trenches were laid. Trenches – A1, A3, A4, B2 and C1 are laid in a cluster and trenches – YP5 and YQ5 were located 80m north of A4. All the trenches exhibit three cultural phases. The lowest settlement belongs to the Iron Age period, which was associated with fine black-and-red ware, red slipped ware, coarse red ware and many glass bangle pieces and beads in different colours. Terracotta objects like hopscotches, spindle whorl, burnishing tools, beads and some rusted iron tools are identified. Following the Iron Age, materials related to the early historical period are attested with abundant russet-coated painted ware, along with fine black-and-red ware, red slipped ware and red ware. Few decorated sherds and graffiti marks, mostly on red ware sherds representing natural elements and geometrical symbols are obtained from this level. Three Tamili (Tamil-Brahmi) sherds were collected at a depth of 90cm in trench A3. The inscribed sherds contain the words *[cā]ttaṉ, .ṅikūr* and *.tai[pa]kaṉ*, each carefully incised most probably at the shoulder portion of the pot. Bangle pieces in shell and glass are plentiful in this level. The typical terracotta and iron objects of the early historical period are collected. Further more, the topmost culture is closely related to the medieval period. Potteries belonging to this level are mostly coarse red ware and red slipped ware. Black-and-red ware are also seen in a coarser form. A very limited fine variety is noticed. Terracotta objects like gamesman, broken lid knob and spout are collected with glass beads and bangle pieces. Burnishing tools and hopscotches in various sizes are obtained along with a spindle whorl.

The cultural setup of Locality-02 is entirely different from Locality-01. Two major cultural phases Microlithic and Neolithic are absent and materials are not

even closely related to Locality-01, except for some polished tools. Thus, it is clear that the earliest settlers settled in the northern region of the hillock due to various reasons. Then extended towards the south of the hillock.

Scientific investigations/Documentation

Scientific investigations at the Chennanur excavation site were undertaken to supplement traditional archaeological methods with advanced analytical techniques. These investigations were critical in reconstructing the site's chronology, understanding material technologies, analyzing burial practices and exploring environmental conditions through a multidisciplinary lens.

Chronometric Dating

a. Optically Stimulated Luminescence (OSL) Dating

To establish an absolute chronology for site usage, OSL dating was performed on sediment samples collected from key stratified contexts. Samples were sent to three renowned laboratories for cross-verification:

- Pipe samples from trench C3 are collected and sent to Physical Research Laboratory (PRL), Ahmedabad
- Pipe samples from trench B3 are collected and sent to Birbal Sahni Institute of Palaeosciences, Uttar Pradesh
- Pipe samples from trench B3 are collected and sent to Oxford University, London

The analyses at PRL and BSIP are in progress and the results are awaiting. Whereas, the OSL date was received for the sample collected from the topmost layer of the Microlithic phase submitted to the Oxford Luminescence Dating Laboratory of the School of Geography and the Environment, University of Oxford, London and it provided the date of 10.47 ± 0.85 ka. The sample has been dated using the OSL signal from quartz using the single-aliquot regenerative protocol.

Sample	Equivalent Dose (GY)	Dose Rate (GY/Ka)	Age (Ka)
CNR24-SS01	37.91 ± 1.62	3.62 ± 0.25	10.47 ± 0.85

b. Radiocarbon Dating

Charcoal samples recovered from secure and sealed habitation trench were sent to BETA Analytic Laboratory, USA for AMS radiocarbon dating. The analysis yielded a calibrated date of approximately 2220 BCE, which provides a vital chronological anchor for the site's primary period of use. This date tentatively places the Chennanur site within the early 2nd millennium BCE, suggesting its importance in southern India during the Neolithic or Pre-Megalithic horizon.

Scientific dates (AMS) of Chennanur

S. No.	Sample Number	Trench/ Layer	Material	Conventional Age in BP	Conventional Age	Calibrated Age
1	Beta 759199	L – 1 /C 3/4	Charred material	3790 +/- 30	1840 BCE	2220 BCE
2	Beta 759196	L – 1 / ZC3/1	Charred material	3650 +/- 30	1700 BCE	2036 BCE
3	Beta 759197	L – 1/ ZD4/2	Charred material	3580 +/- 30	1630 BCE	1953 BCE
4	Beta 759198	L – 1 / ZV2/3	Charred material	3490 +/- 30	1540 BCE	1816 BCE

* Calibrated year to calander year - AMS date minus base year 1950

Recent archaeological excavations in Tamil Nadu are adopting various scientific dating techniques to arrive at an accurate site date. Accordingly, a few crucial excavations received dates for the earliest Iron Age culture in Tamil Nadu, are Sivagalai 3345 BCE, Adhichanallur 2522 BCE and Maiyladumparai 2171 BCE. These dates push back the Iron Age in Tamil Nadu to the early part of the 4th millennium BCE. A series of dates in the time bracket between cal. 2500 BCE and cal. 3000 BCE. Eventually, the Neolithic phases of sites Molapalayam and Chennanur (cal.1759 BCE, 1895 BCE, 2052 BCE and 2199 BCE) received AMS dates that fall between 1600 BCE and 2220 BCE. It is much younger than the Iron Age dates.These significant dissimilarities in dates and period are understandable and inevitable both in chronological context as well as cultural context because, the cultural and functional development of the region is not identical; it is affected by various factors such as landscape, accessibility, ecosystem, natural resources, migrations, minerals and availability of flora and fauna. One could notice an uneven development and co-existence of parallel cultures in many parts of India. For instance, when the Indus Valley experienced an advanced civilization in all spheres of life, the contemporary geographical zones in other parts of India experienced early farming subsistence as seen in the Central Chalcolithic culture and the Southern Neolithic culture. Therefore, having a blanket terminology or expect a uniform subsistence pattern or cultural/economic growth in all geographical zones is very difficult. Therefore, understanding each cultural item both chronologically and spatially is so important and for which scientific dates are required to place them in a proper time frame. The present AMS dates of Chennanur suggest that the site continued its Neolithic subsistence pattern for a longer period.

Palaeobotanical Studies

a. Soil Flotation

To understand the palaeoenvironment and subsistence patterns, soil flotation was conducted on excavated samples collected from ZC3 and B3 (Fig. 18). Lightweight organic residues, including charred plant remains and seeds, were separated and analysed. These samples were forwarded to the Archaeobotany Laboratory at Deccan College, Pune for further microscopic and comparative study. This analysis will offer insights into diet, local vegetation and possible crop cultivation or foraging practices.

Fig. 1.18 Chennanur: Process of Flotation

b. Soil Micromorphology

Soil micromorphological samples were also collected using the plaster bandage method, a widely adopted technique for obtaining undisturbed soil blocks from archaeologically sensitive contexts. The targeted soil block of 20 X 20cm dimension at trench A2 over a floor level was carefully trimmed and isolated, after which medical-grade plaster bandages pre-soaked in water were wrapped around the block to provide structural support. Once the plaster had set and hardened, the blocks were gently undercut, removed and labelled with contextual and orientation data. This technique ensured minimal disturbance to the in-situ microstructures.

The collected samples were subjected to micromorphological analysis under a polarizing microscope. This approach enables the detailed study of the composition of the floor, formation processes, construction activities, microscopic inclusions and post-depositional modifications, contributing significantly to the interpretation of past human behaviour and site usage at Chennanur.

Fig. 1.19 Chennanur: Samples collected for Pollen and Phytolith

c. Pollen and Phytolith Analysis

As part of the environmental reconstruction at the Chennanur excavation site, samples were systematically collected in the stratigraphic sequence from the trenches B4 and ZD4 ranging from the top humus layer down to the natural soil (Fig. 1.19). These samples were subjected to palynological (pollen) and phytolith analyses to gain insights into the site's ancient vegetation, agricultural practices, and climatic conditions. Preserved pollen grains enabled the identification of plant taxa, indicating both natural floral diversity and potential anthropogenic activity such as farming or land clearance. Similarly, the analysis of phytoliths offers micro-botanical evidence of domesticated grasses and cereals. Together, these studies contribute to understanding the subsistence strategies, ecological setting and land-use patterns of the ancient inhabitants of Chennanur, bridging the gap between cultural materials and their broader environmental context.

Documentation

a. 3D Digital Documentation

Advanced 3D documentation was carried out at the Chennanur site using the Artec 3D Scanner, which enabled the creation of precise, high-resolution digital models of artefacts in situ and significant stratigraphic sections (Fig. 1.20). This digital archive ensures long-term preservation and allows for virtual access and future comparative analysis.

Fig. 1.20 Chennanur: Process of 3D Scanning

b. Conventional Documentation

In addition to digital recording, rigorous conventional documentation methods were followed. This included:

- Photographic Records: High-resolution images of each context, artefact and feature were taken from multiple angles during various excavation stages.
- Manual Drawings: Scaled hand-drawn plans, sections and feature profiles were prepared and later digitized.
- Field Registers: Detailed context sheets, trench diaries and locus descriptions were maintained on-site daily, forming the core of excavation data

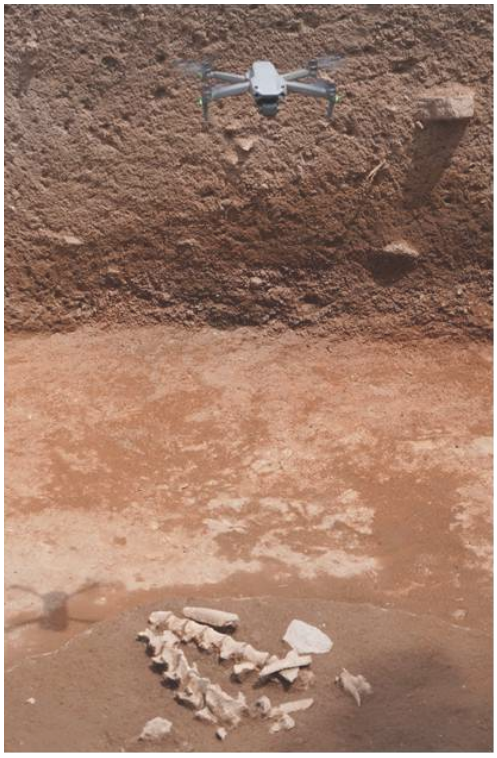

Fig. 1.21 Chennanur: Documentation of Drone photography

c. Drone camera

The use of drone photography and videography played a vital role in the documentation and interpretation of the Chennanur excavation site (Fig. 1.21). Aerial imaging provided high-resolution, top-down perspectives of the trench layout, structural remains and landscape features that are difficult to capture from the ground level. Drone-based orthophotographs helped to detect subtle features such as soil discolourations, alignment of stone structures and site boundaries. The photograph at regular time intervals helps to record site work and document the flow of the excavated trench and its in-situ findings. For example, from trench E6 an animal skeleton identified at 95cm is captured at regular intervals with drone images for documentation purposes.

Significant findings

Lithics

The lithic assemblage from Chennanur presents a diverse and multi-phased record of stone tool technology. Surface explorations yielded chert cores suggesting possibilities for tool production zones. Excavations across several trenches revealed flakes, blade tools and cores in quartz, primarily from the microlithic layers. In deeper levels and transitional contexts, polished stone tools such as celts, hammerstones and sling balls were recovered, particularly in association with Neolithic deposits. The presence of dolerite and quartzite raw materials, alongside finished and semi-finished tools, suggests an established lithic production tradition at the site. The assemblage indicates a gradual shift from flake-based microlithic tools to ground and polished tools associated with agriculture and settled life.

Microlithic

The microlithic assemblage from the site includes several cores, predominantly made from quartz and chert, a fine-grained siliceous material. The microlithic cores are generally small, sub-angular to cylindrical and exhibit multiple flake removal scars, indicating systematic bladelet production. The cores show unidirectional and bidirectional flaking techniques, with a prepared striking platform and a defined flaking surface (Fig.1.22).

Associated with these cores are blade tools in quartz, typically narrow, elongated flakes with parallel sides and sharp working edges. Some blades show marginal retouching, suggesting secondary modification for specific tasks such as cutting, scraping or piercing.

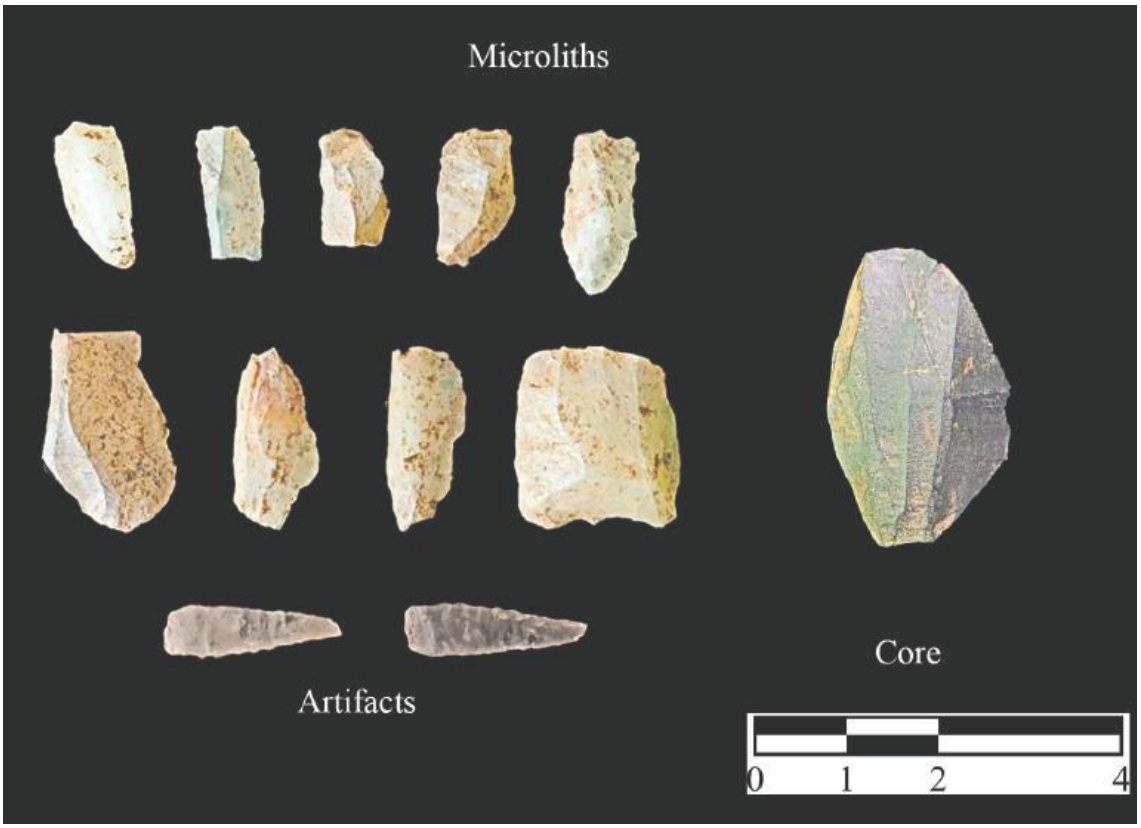

Fig. 1.22 Chennanur: Microlithic core and tools

Celts

The assemblage includes celt tools in dolerite, a ground stone tool typically associated with the Neolithic period. Dolerite, a tough and durable igneous rock, was selected for its hardness and resistance to impact, making it ideal for woodworking and agricultural tasks. The celt is elongated and tapering, with a slightly convex cutting edge and a rounded or blunt buttend. The body of the tool exhibits a well-polished surface, indicating extensive grinding and finishing, a common characteristic of Neolithic ground stone technologies (Fig. 1.23). The dimensions of the tools obtained ranged from 16cm in length, 7cm in breadth and 4cm in thickness with the working edge showing signs of minor chipping, suggesting retouched and prolonged use. This celt was recovered in association with other Neolithic artefacts, including pottery sherds and flakes, reinforcing its cultural attribution.

Fig. 1.23 Chennanur: Polished tools

Faunal Remains

Bone tools

The one bone point is a slender, elongated implement carefully shaped from an animal bone, likely from a medium-sized mammal. It tapers to a fine, sharp tip at one end, while the opposite end is rounded or slightly blunted, possibly for hafting. The surface shows signs of deliberate abrasion and polishing suggesting careful shaping. The tool's smooth finish and consistent form reflect a skilled crafting technique and its utility within daily subsistence or domestic activities. The dimension of the tool in length is 6.1cm and the thickness is 1cm at the end. Another point roughly tapers only from three sides and is made into a sharp tip (Fig. 24).

Fig. 1.24 Chennanur: Bone tools

The bone chisel is 3.2cm in width and 12.1cm in length, a flatter tool, manufactured from a strong segment of bone. One end of the tool has been shaped into a bevelled edge, while the opposite end remains thick and unworked, likely used as a hand grip or for indirect percussion.

Oliva Shell

The artefact is an ornament crafted from an Oliva shell. It has been vertically cut along its longitudinal axis to expose the inner whorls and create a narrow, elongated form (Fig.1.25). The average height and width of the shell measure 2.8cm and 1.1cm respectively and its surface retains traces of natural lustre, although it shows signs of wear consistent with prolonged use. The cutting appears intentional and precise, likely executed using a sharp stone or metal tool. The interior has been smoothed and possibly polished, suggesting it was worn in contact with the skin. Oliva shells are typically associated with coastal or trade-linked sites and their presence in inland archaeological contexts suggests long-distance exchange networks or symbolic value.

Fig. 1.25 Chennanur: Oliva shell bead

Skeleton remains

At a depth of 145cm in Trench-E6, a significant faunal feature was uncovered, a nearly complete skeletal structure of a cattle or buffalo, notably missing the skull (Fig.1.26). The animal had been carefully laid in a sleeping position, suggesting deliberate placement rather than casual disposal. Adjacent to the skeleton, a red ware pot measuring approximately 30cm in height was also discovered. The spatial association of the intact vessel with animal remains points to a possible ritual or symbolic deposition, perhaps connected to belief systems or ceremonial practices of the period. The absence of the head and the careful arrangement imply a culturally meaningful act, warranting further interpretation within the broader context of Iron Age or early historic ritual behaviour.

Fig. 1.26 Chennanur: Skeleton remains of cattle

Animal Horns

Excavations have revealed several animal horn fragments, including those resembling deer and cattle, found in both complete and fragmentary conditions. Notably, in Trench-C3 at a depth of 235cm, a well-preserved horn fragment exhibiting a distinct V-shape was identified (Fig.1.27). The apparent curvature and form suggest it may have been intentionally placed or preserved, possibly for symbolic or ritual purposes. Another horn with a skull part appears from trench A2 (Fig.1.28). The shape of the horn is V-shaped and the broken skull part connects both horns. In articulated and disarticulated contexts, the recurrence of horn fragments across various trenches, hint the cultural significance of animal parts, whether in daily life, ritual activity or as remnants of food processing practices. Their presence contributes to understanding faunal exploitation and symbolic traditions in the site's occupational phases.

Fig. 1.27 Chennanur: Animal horn

Fig. 1.28 Chennanur: Animal horn with skull

Bird beak

A unique find from Trench-ZC3 at a depth of 193cm was a bird beak fragment exhibiting distinct saw-like teeth. The morphology resembles *Ichthyornis,* an extinct fish-eating bird, though precise identification remains uncertain. Its context within the archaeological deposit raises intriguing questions about preservation or possible secondary inclusion. Further zoological and paleo-environmental analysis is recommended to confirm its origin and significance (Fig.1.29).

Antiquities

Plough share

The plough share made of iron, measuring 34cm in length and 4.5cm in width, represents an important agricultural implement from the early Iron Age period. The tool is elongated and tapering, with a broad, flattened cutting edge at one end and a narrowed, tang-like projection at the other, likely used for insertion into a wooden plough beam or shaft. The cutting edge is slightly curved and shows signs of wear and corrosion, typical of prolonged use and long-term burial in soil. The body of the ploughshare is thick and heavy, designed to withstand repeated impact with the ground during tilling. The iron has oxidized, forming a reddish-brown patina over most of the surface (Fig.1.30).

In addition to the ploughshare, several other iron artefacts were identified, including iron nails, fragments of knives, a door jamb nail and various small household objects. All objects found were heavily eroded and rusted, indicating prolonged exposure to the deposit.

Fig. 1.30 Chennanur: Iron plough share

Terracotta Pendent

The artefact is a terracotta pendant with an oval shape, featuring a horizontal groove at the projected part and is likely intended for stringing or attachment (Fig.31). The dimensions of the object measure 7.3cm in length, 4.7cm in width and 1.1cm in thickness. The smooth surface with dual dotted lines is noted at the centre and top of the pendant. A well-defined groove suggests careful craftsmanship with the pendant possibly used as an ornament.

Fig. 1.31 Chennanur: Terracotta pendant

Terracotta Seal

The artefact is a terracotta seal, typically circular in shape, made from baked clay (Fig.32). The surface bears dotted impressions at the periphery and a small projection at the centre is circled with dotted impressions. The reverse side contains a raised knobfor handling. The total length of the object is 4.6cm and the diameter is 3.4cm. This type of seal was commonly used in ancient societies for marking ownership, authenticating goods or sealing documents.

Fig. 1.32 Chennanur: Terracotta seal

Lapis lazuli

The two rectangular and cylindrical beads are made from lapis lazuli, a semi-precious stone prized for its rich blue colour (Fig.1.33). The average length and width of the beads are 1cm and 0.3cm respectively. The beads contain a proper groove at the centre. These beads are uniformly shaped with smooth, polished surfaces that highlight the natural striations of the stone. Their rectangular and cylindrical dimensions suggest they were likely part of a necklace or bracelet, used as personal adornments. Lapis lazuli, often associated with elite status and trade, was highly valued in ancient cultures, particularly in the Near East, South Asia and the Mediterranean. The presence of such beads indicates the significance of long-distance tradenetworks and the use of precious materials in personal and ritualistic practices.

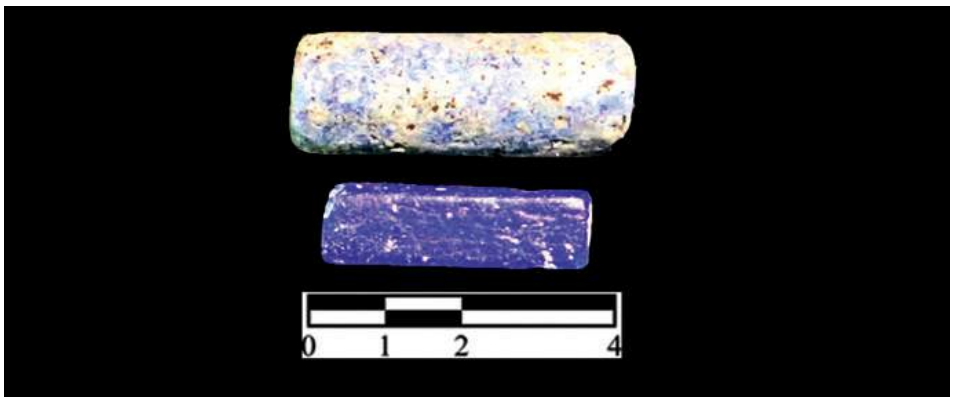

Fig. 1.33 Chennanur: Lapis lazuli beads

Ceramics

Neolithic Potteries

The Neolithic pottery assemblage from Chennanur includes a significant collection of coarse red ware of thick variety with decorations on the exterior side (Fig.1.34) and red burnished ware notable for its careful surface treatment (Fig.1.35). Both the interior and exterior surfaces are finely burnished, indicating a developed ceramic tradition. Among the diagnostic forms, a channel-spouted vessel stands, suggesting utilitarian and possibly ritualistic usage. The pottery closely aligns with the A2 red ware classification as recorded by F.R. Allchin, linking Chennanur to broader South Indian Neolithic ceramic traditions. A full-shaped pot in red ware is identified as having an improper globular shape with a wide rim portion (Fig.1.36). These finds reflect a well-established community with skilled pottery-making techniques.

Fig. 1.34 Chennanur: Decorated ware

Tamili (Tamil-Brahmi) inscribed potsherds

The three red slipped ware sherds bearing Tamili (Tamil-Brahmi) script inscriptions were collected (Fig.1.37). The inscribed sherds contain the words *[cā]ttaṉ, .ṅkūr* and *.tai[pa]kaṉ.* Each carefully incised most probably on the shoulder portion of the pot. The inscriptions are located on the exterior surfaces and are legible despite minor surface erosion. These sherds likely belonged to utilitarian vessels representing early writing practice and reflecting aspects of

identity, ownership or donation. Their discovery provides valuable evidence for using the Tamil-Brahmi script in everyday contexts during the Early Historic Period.

In addition to the inscribed sherds, the site has yielded a variety of other ceramic materials, including graffiti-marked sherds featuring both geometrical patterns and several painted potsherds have also been identified, bearing traces of white pigment decoration or painted linear designs, reflecting aesthetic and cultural expressions in ceramic usage. Furthermore, fragments of a fine rouletted ware, typically associated with trade and early historic contexts have been recovered.

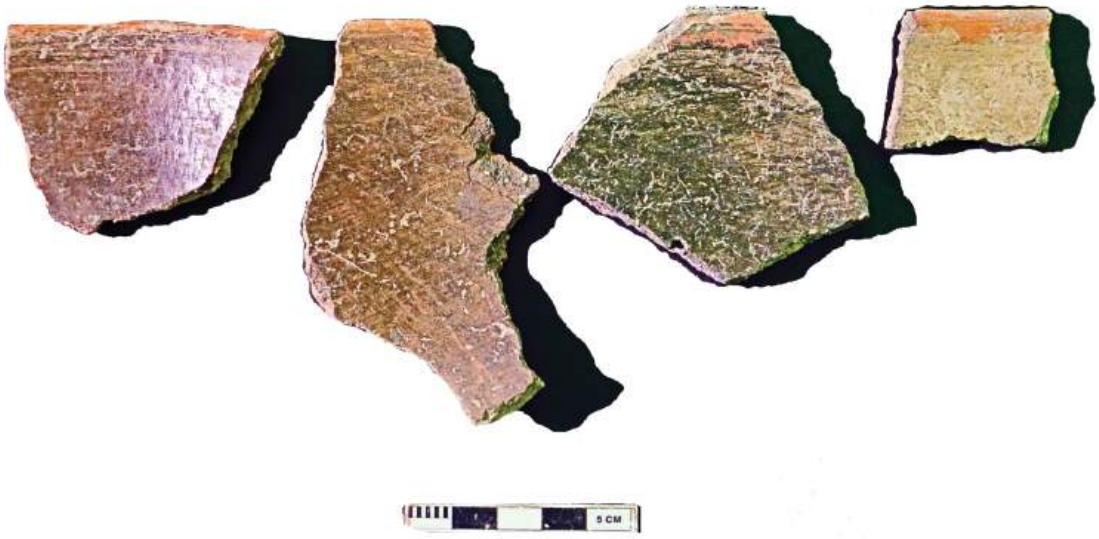

Fig. 1.35 Chennanur: Burnished ware

Fig.1.36 Chennanur: Full-shaped pot

Fig. 1.37 Chennanur: Tamili (Tamil-Brahmi) inscribed sherds

Chronology

The archaeological investigations at Chennanur have revealed a well-preserved and stratified cultural sequence, ranging from the Microlithic period to the Medieval era. Based on stratigraphic evidence from multiple trenches (notably C2, B2, ZC3, ZD4 and others), six distinct cultural phases were identified. Each layer was associated with characteristic soil textures, features and a well-defined assemblage of antiquities, reflecting continuous human activity, adaptation and transformation across time. By sifting the fragments of evidence, we had meticulously gathered and piecing them into a coherent narrative, a dynamic picture of human activity at Chennanur begins to emerge. In addition to this, scientific dates, such as OSL (Optically Stimulated Luminescence) and AMS (Accelerator Mass Spectrometry), were obtained to reinforce the study on chronology, which provides valuable supporting data for the excavation report by determining the accurate date for the site.The earliest traces of settlement unearthed at this site belong to the Microlithic phase.

Microlithic Period (ca. 10000–3000 BCE)

The dark reddish-brown gravelly deposit yielded microlithic tools, including blade flakes, backed artefacts and cores mainly in quartz and scanty chert at the surface level. No pottery was found in this phase, supporting its identification as pre-ceramic. The microlithic period is determined from the OSL (Optically Stimulated Luminescence) dating technique. Accordingly, the date received from Oxford Luminescence Dating Laboratory of the School of Geography and the Environment, University of Oxford, London provided the date of 10.47±0.85 ka from samples collected from the Trench-B3 at 193cm depth

belonging to the transition level from Microlithic to Neolithic. The microlithic assemblage collected from this level of the trenches has received the date of 8450 BCE. These tools indicate hunter-gatherer activity, representing the earliest cultural occupation at Chennanur. Their presence suggests short-term camps or tool production areas.

Neolithic Period (ca. 3000–2500 BCE)

The Neolithic horizon was marked by a reddish-brown clayey deposit. This layer was rich in red burnished ware and coarse red ware pottery. Terracotta spindle whorls, shell bangle pieces, broken and full-shaped polished stone tools were found. Charred animal bones were scattered throughout, especially dense around pit activities, suggesting food processing and domestic use. In Trench B2, stone rubble, possibly a lava stone grilling feature, might have been an oven was found and can be possibly identified as remains of collapsed Neolithic structures (Fig.1.38). The Neolithic date is scientifically attested by the BETA Analytic Laboratory, USA. The charcoal samples recovered from the trenches C3 and ZC3 at a depth of 238cm and 368cm respectively were sent for AMS radiocarbon dating. The analysis yielded a calibrated date of 2199 BCE and 2052 BCE, which provides a vital chronological anchor for the site's primary period of use. This layer is noticed above the Microlithic context.This layer provides evidence for a stable agro-pastoral community with clear signs of technological and social organization.

Fig. 1.38 Chennanur: Lava stone grilling

Transitional Phase (Neolithic-Iron Age) (ca. 2500–1500 BCE)

Above the Neolithic levels, a mixed cultural layer was encountered, indicating overlap or transition between Neolithic and Iron Age traditions. The soil was moderately compact and varied in texture. This layer produces a combination of Iron Age and Neolithic potteries along with polished stone tools. A large oven-type structure is identified with the boundary packed with mud at trench ZC3 from the depth of 185cm, where prolonged heating evidence is noticed (Fig.1.39). Notably, broken celts, dolerite hammerstones, cores and large flakes were discovered. Burnished ware and coarse red ware occurred alongside residual Iron Age fragments. Several pits were noted in this context, possibly associated with refuse disposal or ritual practices. The coexistence of metal and lithic artefacts highlights a dynamic phase of cultural convergence.

Fig. 1.39 Chennanur: Oven structure

Iron Age (ca. 1500–600 BCE)

Stratigraphically distinct by a compact dark brown clay-silt-sand matrix, the Iron Age levels yielded rich cultural material. Pottery types from this layer include BRW, RW, RSW and scanty burnished ware. Noteworthy antiquities include iron implements like nails, blades and knife fragments, many of which were heavily corroded. At least one lime-plastered floor surface, embedded with pottery chips and stone flakes, was recorded (e.g., in Trenches-A2, C2, C3, B3, B4 and C4). At this level, an iron ploughshare is identified in a rusted condition. Numerous pit features and concentrations of charcoal suggest both domestic and industrial

activity. A water well is identified from this level in trench C4. A well is dug deep into the bedrock for about 3m depth and the total height of the well is 6m. The diameter of the well is 1.07m. The well contains a very loose deposit and potteries of mature Iron Age with painting designs on the vase, bowl and other types that belong to this period. (Fig. 1.40) This level represents a fully settled phase with technological advancement in metallurgy.

Fig. 1.40 Chennanur: Water well

Early Historic Period (ca. 600 BCE – 300 CE)

This phase was characterized by a pale brown semi-compacted deposit containing a variety of diagnostic antiquities. Ceramic types include Black-and-Red Ware (BRW), Red Ware (RW) and Red Slipped Ware (RSW). Terracotta objects such as beads, spindle whorls and figurines were commonly encountered. Glass fragments and ornamental items like shell and glass bangle pieces were also recovered, pointing towards well-established habitation, craft production and trade linkages during this phase. This level is considered to be the first layer in trenches of A2, C2, C3, B3, B4, C4, E6 and I2 (Fig. 1.41). The presence of Tamili and graffiti inscribed potsherds along with domestic and semi-industrial artefacts, indicates a flourishing settlement zone.

Early Medieval Period (ca. 300–1000 CE)

Just above the Early Historic Period deposits, the Early Medieval phase was marked by a similar greyish soil, slightly denser in composition in two trenches, Trench-ZC3 and Trench-ZD4. Pottery assemblages include coarse utilitarian ware with occasional slip marks, possibly linked to domestic storage. No architectural features were clearly traceable, although the context hints at continued occupation with reduced intensity.

Fig. 1.41 Chennanur: Southern section of Trench - B4

Fig. 1.42 Chennanur: Western section of Trench – ZC3

Medieval Period (1000 CE)

The uppermost deposits in select trenches (ZC3, ZD4) consisted of compact greyish brown soil with minimal structural remnants (Fig.1.42). The antiquities include fragmented roof tiles, coarse red ware and a few thick variety pottery sherds. These suggest a surface-level reuse or sporadic occupation during the Medieval Period, possibly for temporary or seasonal activities.

Conclusion

The Chennanur site offers a rare window into long-term cultural development in the region. The antiquities, stratigraphy and features present a continuous occupational history from the Microlithic to the Medieval Period. The well-stratified nature of the site and the presence of clear transition phases make it a key site for understanding technological and socio-cultural shifts across prehistoric and early historic South India. The accuracy in periodiation of the site is improved with the support of scientific dating techniques like OSL and AMS radiocarbon techniques. OSL dating at Chennanur for the Microlithic level is a pioneer in Tamil Nadu excavations. The date received against the samples is the first and earliest date for the Microlithic level, i.e., 8450 BCE. Microlithic culture at Chennanur might serve as a reference for future Microlithic studies in Tamil Nadu. Likewise, the date received from BETA Laboratory undoubtedly falls under the Neolithic period. The earliest calibrated date obtained from the charcoal is 2220 BCE, which belongs to the Neolithic phase.

The Microlithic layer, characterized by gravel-rich reddish-brown soil, yielded quartz blade flakes, cores and tools indicating a pre-ceramic, mobile forager community. These finds mirror microlithic traditions seen at other South Indian sites such as Sanganakallu and Kurnool, where early groups occupied ecologically rich zones near water sources and raw material outcrops. The absence of pottery in this layer supports its assignment to an early Mesolithic horizon, before sedentism. Above this, the Neolithic deposits at Chennanur are marked by polished stone tools (celts, hammerstones, sling balls), burnished and coarse red ware pottery and abundant charred animal bones. The presence of terracotta spindle whorls and shell bangles indicates textile production and personal ornamentation. These features are consistent with Neolithic patterns identified at Paiyampalli (Tamil Nadu), Utnur and Nagarjunakonda (Andhra Pradesh) and Tekkalkota (Karnataka), sites known for early agro-pastoral economies, polished lithics and semi-permanent settlements. The faunal remains and pit activities suggest that Chennanur was similarly a stable, settled site engaged in animal domestication, food processing and possibly early ritual activity.

A notable discovery supporting ritual behaviour is from Trench-E6, where a nearly complete cattle or buffalo skeleton was deliberately laid in a sleeping posture and was recovered alongside a red ware pot. The absence of the skull and the careful placement of the vessel imply a symbolic or ceremonial offering, comparable to animal depositions observed at Utnur and certain Neolithic burial contexts in the Eastern Deccan.

The transition layer between Neolithic and Iron Age levels featuring dolerite cores, broken celts and mixed ceramic forms, marks a dynamic cultural overlap. This fusion of lithic and early metal tools reflects a gradual adaptation rather than an abrupt technological shift, as similarly observed at sites like Maski and Hallur. The transition at Chennanur reveals that older traditions persisted alongside newer practices, likely as communities negotiated changes in resource use and social organization. The Iron Age horizon is marked by compact dark brown soils rich in Black-and-Red Ware (BRW), Red Slipped Ware (RSW), iron tools and structural remains such as lime-coated floors. These layers show evidence of increased domestic and industrial activities, including hearths and extensive use of fire. Such features align with Iron Age occupational signatures at Kodumanal and Adichanallur, reinforcing Chennanur's position within the larger Iron Age cultural landscape of South India. Overlying this are early historic deposits, identifiable through more refined ceramic types, terracotta figurines, glass ornaments, Tamili inscribed potherds and trade-linked artefacts. The increased presence of long-distance trade goods and craft materials suggests Chennanur was integrated into wider economic and cultural networks during this period, paralleling developments seen at Karur and Arikamedu.

Though thinner, early medieval and medieval layers, show continued albeit diminished occupation. Fragmented roof tiles and glazed pottery fragments suggest re-use or sporadic habitation, possibly linked to shifting settlement patterns or resource availability.

An exceptional find from Trench-ZC3 includes a bird beak fragment with saw-like teeth, resembling the extinct fish-eating bird *Ichthyornis*. Although its identification remains tentative, the discovery highlights rare preservation conditions and opens new avenues for paleoenvironmental inquiry. The lithic assemblage, ranging from microliths in quartz and scanty cores in chert to polished Neolithic celts, not only aligns with typologies across South India but also confirms Chennanur's long-term technological evolution. The diverse toolkits, symbolic deposits and cultural layering underscore the site's role in understanding the local lifeways and regional cultural trajectories.

In general, Chennanur offers a microcosm of cultural transformation, continuity and adaptation over time. Placing alongside major Neolithic and Iron Age sites in peninsular India, it enriches our comparative understanding of early settlement dynamics, tool traditions and ritual behaviour. Future research, especially in archaeobotany, micromorphology and residue analysis, will help further illuminate the lives of Chennanur's ancient inhabitants and their place within South India's prehistoric landscape.

Acknowledgement

I would like to express my enormous pleasure and appreciation to all those involved in the excavation, directly and indirectly, to bring out the forgotten historical and cultural values of the Chennanur site. Special thanks to the Archaeological Survey of India, Government of India for granting permission for excavation. I express sincere gratitude to the research scholars Mr. D. Vijay, Mr. Devandran, Miss. M.P. Siddarthini, Mr. Balavignesh, Miss. Sandhya, Mr. Pragatheeswaran and Miss. Rebecca whose dedication, insight and hard work greatly contributed to the excavation. We thank the villagers of Chennanur for their support in the excavation work.

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Excavations at Thirumalapuram

K.Vasanthakumar
T.Kaleeswaran

Introduction

Thirumalapuram (Lat. 9°16'37" N; Long. 77°26'36" E), Sivagiri Taluk, Tenkasi District, is about 4km west of Ullar village and 10 km north-west of Vasudevanallur, 30km south of Rajapalaiyam and 51km north of the district headquarters. The Iron Age megalithic burial ground (Lat.9°17'48.05"N; Long.77°22'57.62" E) is located 10km northwest of the present Thirumalapuram village (Fig. 2.1). To approach this site, one must travel approximately 51km towards north Tenkasi-Rajapalaiyam road (NH 744) and take a diversion from Ullar village for about 6km towards west. The site is located between two seasonal streams originating from the Western Ghats, 1km east of the reserved forest and west of the Kulasegaraperari irrigation tank. Iron Age megalithic burial ground is spread over an area of approximately 35 acres.

Geology

The geological fabric of the district is predominantly defined by its hard rock terrain, with nearly 90% composed of resilient formations such as charnockite, gneiss, granite and pegmatite. These ancient rocks lend strength and structure to the landscape, influencing everything from topography to the availability of natural resources (Fig. 2.2). The remaining 10% features sedimentary rocks, which include sandstone, limestone, sandy clay and alluvium gently resting in the low-lying regions, where erosion and deposition have shaped softer, more fertile ground.

Physiography and Drainage

Thirumalapuram is located on the western side of the Western Ghats, which influences its climate and hydrology. This region is situated in the rain shadow tract of the Western Ghats. This region lies within the tropical zone and receives moderate to heavy rainfall during summer (June-September) from the Southwest monsoons and winter (October-December) from the Northeast monsoons. The average annual rainfall for the summer and winter seasons is 620mm and 960mm,

respectively. The river Vaippar originates in the Western Ghats and flows through Tenkasi, Virudhunagar, Madurai and Thoothukudi districts before reaching the Bay of Bengal. The basin area is covered in 4 districts, namely Virudhunagar 68%, Thoothukudi 20% Madurai 7% and Tenkasi 5%. The length of the Vaippar river is 112kms finally, it debouches into to Bay of Bengal in the Gulf of Mannar (Fig. 2.3).

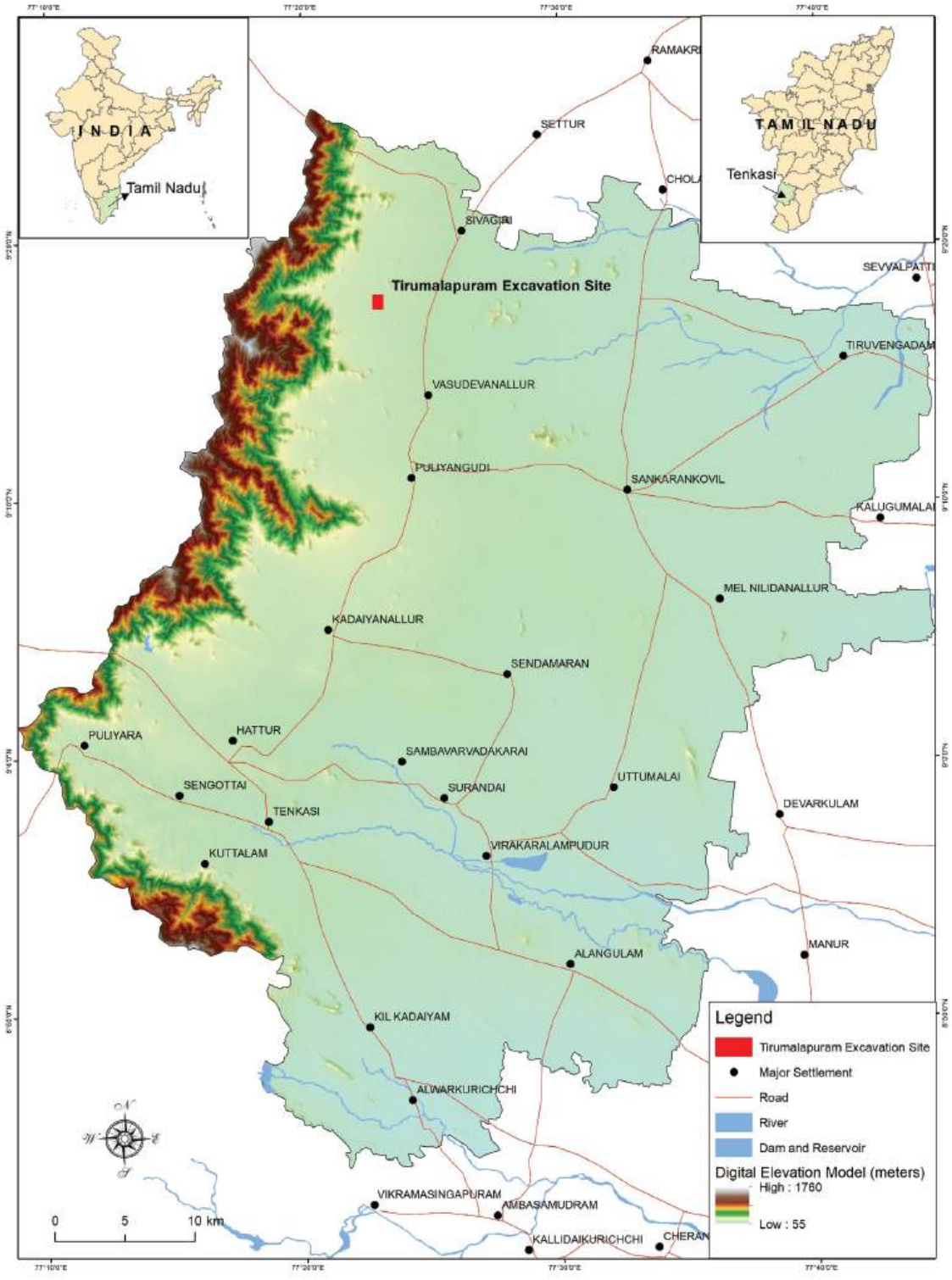

Fig. 2.1 Thirumalapuram: Location map

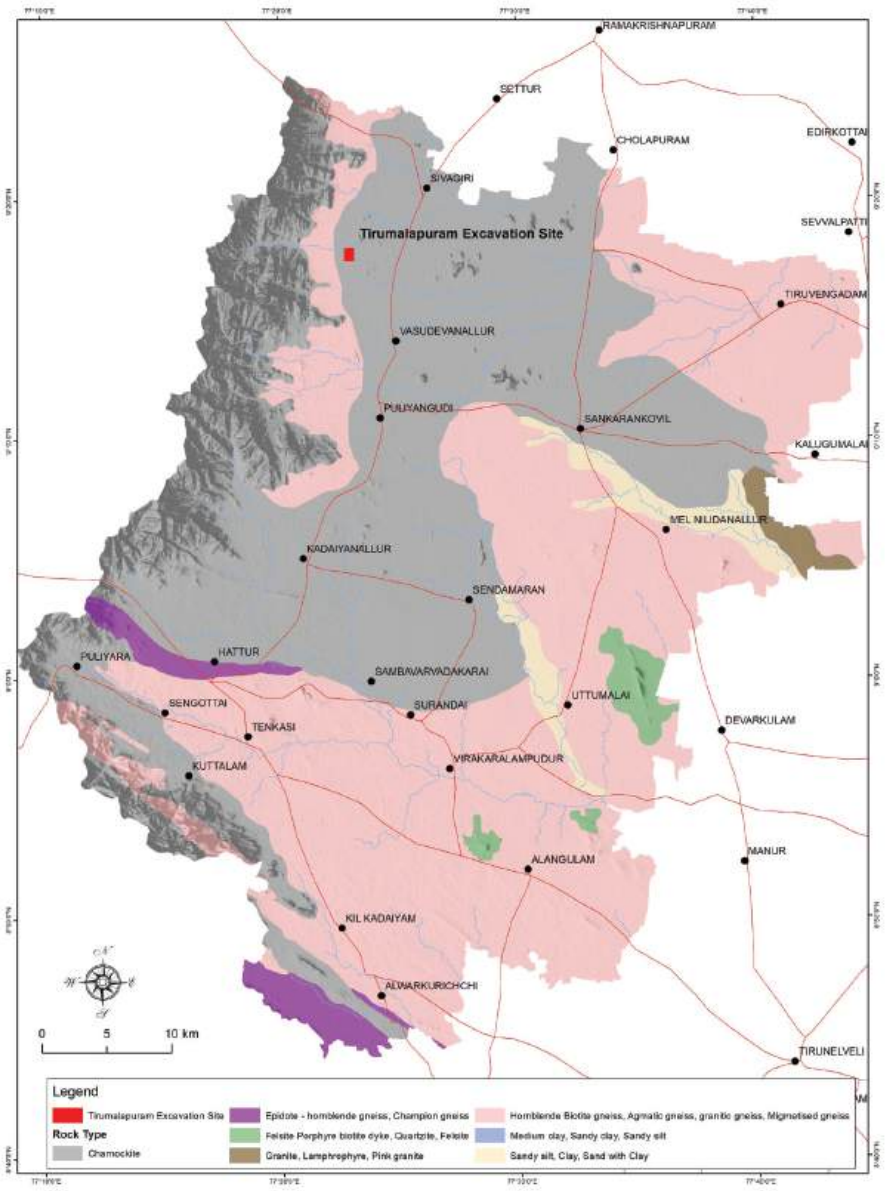

Fig. 2.2 Thirumalapuram: Geology map of Tenkasi district

The Vaippar river basin is one of the major river basins in Tamil Nadu, having a drainage area of 5,423 sq. km. It is bounded by the Vaigai basin and Western Ghats on the western side, Tamirabarani and Kallar river basins on the southern side and the Gundar river basin on the northern side. This basin has been divided into 13 sub-basins as follows:

1. Nichabhanadhi, 2. Kalinkalar, 3. Deviar, 4. Nagariyar, 5. Sevalperiyar, 6. Kayalkudiyar, 7. Vallampatti odai, 8. Sindaplli Uppodai, 9. Arjunanadhi, 10. Gowshiganadhi, 11. Uppathurar, 12. Senkottaiyar and 13. Vaippar Main.

The notable practice of water management system for utilizing every available source of water supply with its numerous stone anicuts across the rivers and streams.

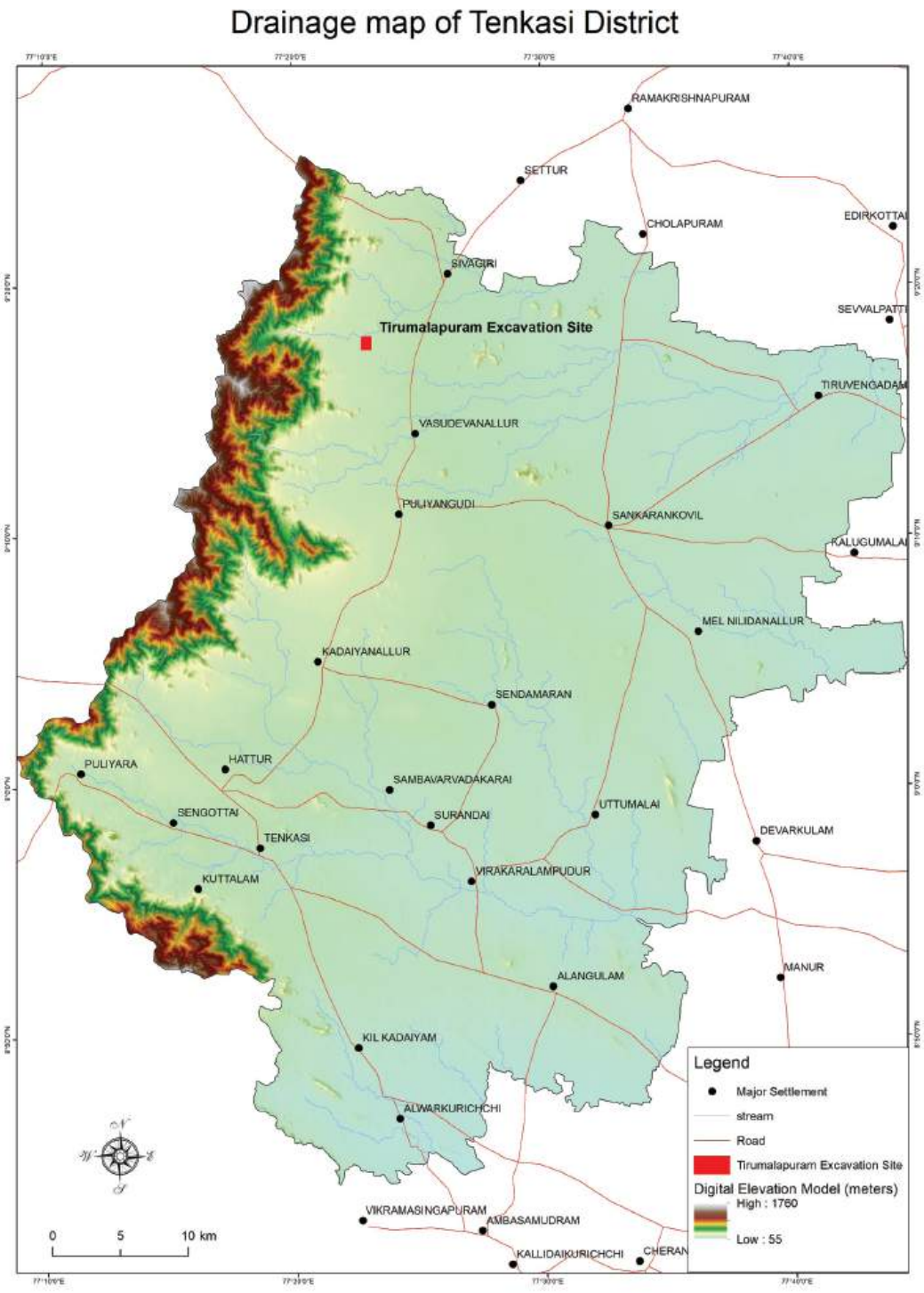

Fig. 2.3 Thirumalapuram: Drainage map of Tenkasi district

Flora and Fauna

Tenkasi district, located in the southern part of Tamil Nadu, is known for its rich natural landscape that includes a variety of ecosystems from lowland plains to hill forests of the Western Ghats. These varied ecological conditions have contributed to a significant diversity in plant life. The flora of Tenkasi not only reflects the ecological wealth of the region but also plays a vital role in supporting

its wildlife, agriculture and local medicinal practices. Understanding the flora is crucial for biodiversity conservation and sustainable development in this newly formed district.

In Tenkasi District, the major horticulture crops are mango, guava, banana, lemon, tomato, brinjal, lady's finger, onion, coriander, chilies, flowers like jasmine, arali and tuberose etc. In total, about 112813 hectares are covered by various horticulture crops in this district. Trees like neem, banyan, coconut, palmyra, tamarind, moringa, papaya, guava, *karuvelam* and banana are noticed in this village. In the agricultural land, people grow paddy grains, sesame, sugarcane and vegetable plants.

In the early 90s, C.G. Webb Peploe explored the Tirunelveli region (now Tenkasi district separated from Tirunelveli district) and noted some important South Indian birds, namely painted stork, black-winged stilt, sooty tern, Indian moorhen, banded crake, European wryneck, red-headed marlin, Indian three-toed kingfisher, red-winged crested cuckoo and orange-headed ground thrush.

Tenkasi district in Tamil Nadu is teeming with biodiversity, thanks to its proximity to the Western Ghats and its diverse range of habitats, including lush forests, wetlands and agricultural fields. *Vagaikulam* pond is a hotspot for water birds like painted storks, spoonbills and spot-billed ducks, while land birds such as peafowls, parakeets and barn owls add vibrant life to the surroundings. Kutralam is home to diverse spider species that silently keep pest populations in check and wetlands brim with aquatic plants that nourish the ecosystem. Even the smaller creatures, such as bees, wasps and ants, contribute to pollination and balance. It is a region where nature quietly thrives, offering a rich tapestry of wildlife for curious minds and keen eyes.

Tenkasi district, nestled in the lap of the Western Ghats, is home to a rich mosaic of wild animals that thrive in its forests and hilly terrain. Majestic Asian elephants can be seen roaming through forest patches and occasionally venturing into farmlands, while Indian gaurs, sloth bears and spotted deer traverse dense woodland areas. More elusive residents like the Madras hedgehog, endemic to southern India, quietly emerge during the monsoon season. Agile mongooses and stealthy civet cats skulk near human settlements and wild boars forage through the underbrush. Together, these creatures make Tenkasi a vibrant part of natural heritage, where every corner of the wilderness hides a story waiting to be discovered.

Previous study of this region

In Tamil Nadu, every river has played an important role in forming and preserving its cultural treasures. So we began exploring this region, which contains rich cultural values dating from the Mesolithic Period to the Modern Period. During exploration, many sites were identified in this region and five forms of antiquarian remains, such as Mesolithic sites, urn burial sites, habitation sites, monumental remains and loose sculptures, have been identified and documented. We discovered a few new sites and re-visited previously reported sites, revealing new findings previously unknown.

The preliminary results presented here are the horizontal extent of the site and the relationship between the sites in those days. The following archaeological sites were explored and their cultural artefacts were identified.

Previous excavations in the region

In 1992-1993, Sampath and Srikumar discovered a fossilized lower left molar identified as *Elephus maximus* of a living Indian elephant at Vembakottai. In 2010-11, M. Rajesh investigated the Vaippar river basin and noticed several archaeological mounds. He brought to light the archaeological potential of this river basin and the necessity to investigate the Vaippar river. Before Independence, the Deputy Collector of Tirunelveli L. Cammiade explored the Vaippar basin. According to various researchers, through their explorations in the Vaippar basin stated that different cultural vestiges dating from the Microlithic to the Medieval Period, in association with stone tools, pot sherds and sculpture.

Mangudi Excavation

Mangudi, a microlithic site, is situated on the banks of river Deviyaru in Tenkasi District, Tamil Nadu. Tamil Nadu State Department of Archaeology started excavation during the year 2001-2002 and it had yielded the Microlithic tools, artefacts belonging to the prehistoric and historic periods. The ancient name of the place is *Cirumangkalam*. In the excavation variety of artefacts, including red ware, red slipped ware, black-and-red ware, black ware, russet-coated ware, terracotta figurines, iron implements, beads and charred grains were unearthed.

Vembakottai Excavation

The huge habitation mound is located on the left bank of the river Vaippar. The site Vembakottai, with the cultural deposit extending over a vast area of more than 50 acres and mound that rises about 6m in height from the ground level, is located geographically between Lat. 9°20'3.39"N and

Long. 77°46'2.56"E. The archaeological mound is locally called *Mettukadu* or *Uchimedu*. During the field survey, the mound represents the multi-layered occupation at the site, suitable for large-scale horizontal excavation. The systematic excavation was initiated at Vembakottai in 2022. A total of 16 trenches were laid in the first phase and 18 trenches were laid in the second phase of excavation. The trenches were laid out on the top of the mound and it yielded a maximum cultural deposit of around 2.60m yielding ceramics such as black-and-red ware, red ware, red slipped ware and black ware. Red ware, the common shapes including variants comprises several kinds of bowls, dishes, vases, conical vessels, small jars, carinated pot and others. The antiquities include hopscotch, glass bead, shell bead, shell bangles, terracotta figurines and gold objects.

Karivalavandanallur

The site is located at a distance of 21km from the excavated site. The ancient name of the place is *Karivara-nallur*. The site has been inhabited by people from Iron Age to the Late Medieval Period. Iron Age urn burials, Roman coins dating of Early Historic Period and a late medieval period inscription have been reported from the site.

Kilanalantula

The site is located in Sankarankovil taluk, Tenkasi district. Iron Age urn burials had been reported from this site.

Puliankudi

The site Puliankudi is located 19km away from the excavated site. Iron Age urn burials had been reported from the site.

Thirumalapuram

The ancient name of the place is *Tirumalai*. Microlithic blades and points made of quartz and chert dating back to Microlithic period are reported. The site also had an early medieval period inscription, rock-cut cave and a medieval period inscription.

Vasudevanallur

The site is located 10km north-east of the excavated site. The ancient name of the place is *Vasuteva-nallur*. Iron Age urn burials had been reported from the site.

Vellanakottai

The site is located 14km away from the excavated site. Black-and-red ware, red ware, black ware and urns of the Iron Age have been reported.

Recent Explorations in and around the Thirumalapuram excavation site

Archaeological settings in and around Thirumalapuram excavation site					
S. No.	Site	Geocoordinates	Distance from the excavation site	Cultural Period	Cultural Remains
1	Velayuthapuram (Kurusu Malai Matha shrine)	9°16'36.44" N 77°26'26.47" E	12 km east of Thirumalapuram	Iron Age	Burial site, black-and-red ware, red ware, black ware
2	Thalayanai	9°18'14.48" N 77°22'11.12" E	2 km from Thirumalapuram	Iron Age	Furnace, black-and-red ware, red ware, black ware
3	Athuvazhli (Desiyampatti, Chintamani Peri Lake)	9°16'21.28" N 77°23'40.94" E	5 km east of Thirumalapuram	Iron Age	Iron slag, black-and-red ware, red ware, black ware, sling ball, muller
4	E.Duraisamypuram	9°03'56.21" N 77°27'32.65" E	37 km south of Thirumalapuram	Iron Age	Iron slag, black-and-red ware, red ware, black ware, urn, a stone slab carved with Sudarshana Chakra (Thiruvazhikkal) was noticed on the roadside of this site
5	Sendamaram	9°04'01" N 77°26'26.75" E	35 km south of Thirumalapuram	Historical	Sluice pillar and a fragment of the temple members
6	Veerasigamani	9°05'30.39" N 77°26'26.03" E	32 km south of Thirumalapuram	Iron Age	Iron slag, black-and-red ware, red ware, black ware, graffiti with X-mark

S. No.	Site	Geocoordinates	Distance from the excavation site	Cultural Period	Cultural Remains
7	Pambu Kovil Shandy	9°07'35.08" N 77°25'47.98" E	27 km south of Thirumalapuram	Historical	Sluice carved with two Siva lingam, fragments of temple
8	Thiruvettanallur	9°08'19.12" N 77°24'35.33" E	22 km south of Thirumalapuram	Historical	Sati stone
9	Chinthamani	9°11'42.56" N 77°24'0" E	22 km south of Thirumalapuram	Historical	Sati stone
10	Narayanapuram	9°15'24.21" N 77°24'22.06" E	10 km south of Thirumalapuram	Historical	Sati stone
11	Kadalur (Cuddalore)	9°16'30.42" N 77°27'29.52" E	14 km east of Thirumalapuram	Historical	Sluice dated 1896 CE in kanmai. Temple, Ganesha sculpture
12	Paruvakkudi	9°17'34.18" N 77°32'43.10" E	22 km east of Thirumalapuram	Historical	A thiruvazhikkal (chakra and sangu) carved on a stone pillar
13	Sivagiri	9°19'08.22" N 77°23'39.05" E	6 km north of Thirumalapuram	Iron Age	Urn burial site is located in the outskirt of the Sivagiri town near the Rajasingaperi Kannmai of Poothai Raakku Amman Temple, black-and-red ware, red ware
14	Malayadikurichi	-	17 km southeast of Thirumalapuram	Microlithic, Iron Age, Early Historic and Historical	Microlithic tools, habitation-cum-burial site, cave temple executed by Komaran Centan in 637 CE

Excavations at Thirumalapuram

The graveyard, partially disturbed, is located on the western fringe of the water spread of the tank called *Kelasekarapereri*. The burial ground covers an area about 15 hectares of non-productive elevated land due to the cairn packing spread across the mound. Several graves were disturbed due to vandalism and by treasure hunters. Some of the antiquities such iron objects, bronze objects, black-and-red ware pots, black polished ware and urns were removed and kept in the premises nearby landowner. Keeping in view of the rich archaeological findings, it is proposed to excavate the site before it is being completely remove from the context.

Thirumalapuram Cuttings

The key plan of the Thirumalapuram mound shows that the entire area was laid out into a grid network, each measuring 5m x 5m. The mound was subdivided into 4 zones, keeping in view the cardinal directions. The centre of the mound has roughly been fixed, keeping in view the surface features of the mound; a total of 37 trenches have been opened (Figs. 2.4-2.5). The central peg was numbered as A1. The trenches of A1, B1, A2 and B2 were laid in the southeast zone of the mound. Similarly, in clockwise order, the X series trenches of XC1, XC2, XD2, XE1, XE2, XF1, XF2, XG1, XG2, XH1, XH2, XH3, XI1, XI2, XI3, XJ1, XJ2, XJ3, XK1 and XK2 were laid in the southwest zone of the mound. In the Y series, the trenches of YC1, YD1, YE1, YI1, YI2, YI3, YJ1, YJ2 and YJ3 were laid in the northwest zone of the mound. In the Z series, ZA1, ZB1 and ZC1 were laid in the northeast zone of the mound. In each case, the peg affixed to the northwest corner of the trench determined the number of trenches as well as served as a reference peg. Trenches have revealed geological stratigraphic layers with material remains. These trenches reached natural soil at various depths, depending on the landscape.

Fig. 2.4 Thirumalapuram: Arial view of excavated trenches

Fig. 2.5 Thirumalapuram: General view showing urn burials

Megalithic-1 (Meg.-1)

The trenches XH1, XI1, XJ1, XK1, XH2, XI2, XJ2, XK2, XH3, XI3, XJ3, YI1 and YJ1, later these thirteen trenches were merged as Megalithic-1 because all of them were exposed within a rectangular enclosed slab circle, an unusual structure for the first time exposed in a grave of Tamil Nadu (Figs. 2.6-2.7). A rectangular structure constructed by placing a series of rectangular slabs vertically installed around the grave. The orthostat-based rectangular structure measures 13.5m in length and 10.5m in width. The rectangular structure consists of 36 stone slabs or orthostats. These vertical slabs appear to serve as a boundary of the burial. The entire structure looks like a stone chamber. On the northern side of the chamber, another parallel wall built of orthostats was identified, comprises six slabs in total. The maximum length of an orthostat is 2.90m. The rectangular chamber was divided into four quadrants, within which six urns were discovered. Each of these urns has been identified with cairn packing. Grave goods were found on both the outer and inner sides of the urn. The grave goods consist of bowls, ring stands, pots and iron objects like arrowheads and axes. One of the interesting observations is that three arrowheads were found with wood fibers expressing the way these arrowheads were fixed and deployed. The urns were exposed with a secondary burial having a few bone fragments.

Fig. 2.6 Thirumalapuram: General view of Megalithic-I

Trench-YI1

The trench YI1 in Megalithic-1 complex is adjacent to the trench YJ2 on the north and YJ1 on the west. The close observation of the layers revealed the method of burying and packing the graves. Besides humus, 3 layers, namely layer 1, layer 2 and layer 3 were noticed. The humus is of recent activities and agricultural waste was found within the humus. Layer 1 is semi-compact and silty sand in texture. Layer 2 is filled with cobble packing and sand. Layer 3 is loose and sandy silt in texture. The urns were found in layer 3. Urn-79 is found in the northeast part of the trench below the cairn packing at a depth of 1.01m. The urn has a red slipped conical lid extending up to the shoulder portion. The

urn is made of red slipped ware. Two grave goods were placed outside the urn. Inside the urn, seven grave goods were placed which include a basin made of red slipped ware, three daggers, a chisel and two black-and-red ware bowls. One of the bowls had a white painted design. Fragments of bones and teeth were found inside the urn, indicating a secondary burial. Four ring stands were noticed on the southwest corner of the urn.

Fig. 2.7 Thirumalapuram: General view of megalithic-I quadrant-1 and 3

Megalithic-2

Megalithic-2 is found on the east side of the mound. The trenches ZA1, ZB1, ZC1, A1, A2, B1 and B2 were merged and named Meg.-2 (Fig. 2.8). Only the western half of the burial was excavated. The humus and layer 1 were removed due to recent activity. Layer 2 and Layer 3 are noted. Layer 2 is filled with cairn packing. The urns were found in layer 3. A total of 10 urns were noticed in Meg.-2.

Fig. 2.8 Thirumalapuram: Arial view of Megalithic-II

ZA1

The trench ZA1 in Megalithic 2 is adjacent to A1 on the south and ZB1 on the east. No urns were traced in the trench. Only fragments of potsherds were found on the northwest corner of the trench at a depth of 2m.

ZB1

The trench ZB1 in Megalithic 2 is adjacent to ZA1 on the west, B1 on the south and ZC1 on the east. Only one urn (Urn no.1) is found in the trench on the north east part close to the eastern section. The urn is made of red slipped ware. On the exterior surface of the urn, dotted design is noticed. The drawing represents possibly a human, a mountain, a deer and a tortoise (Fig. 2.9).

ZC1

The trench ZC1 in Megalithic 2 is adjacent to ZB1 on the west. Layer 2 and layer 3 are noted. A stone slab is found in the trench and it is placed diagonally in west to east orientation. Only the southwest part of the trench is excavated. Three urns (Urn No. 5, 6 and 9) were found in the trench. All three urns were made of red slipped ware with the presence of black-and-red ware lid.

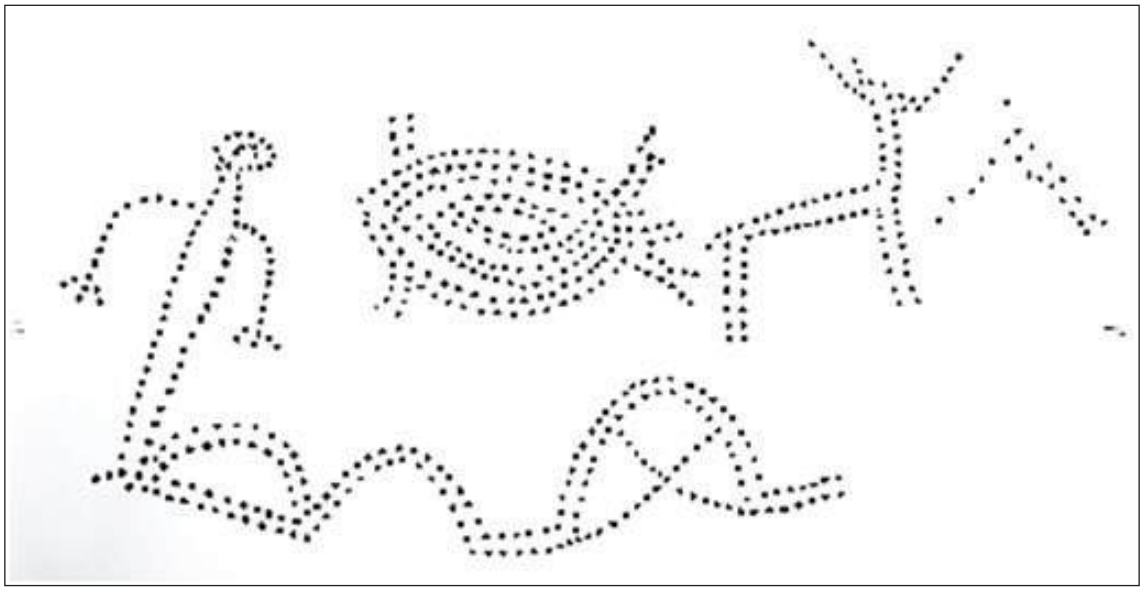

Fig. 2.9 Thirumalapuram: View of figurine in Megalithic-II, Urn 1

Meg. 2, Urn-5

The urn is traced at a depth of 0.75m in the northwest part of the trench. The urn is made of red slipped ware and it is broken. The rim and the body portions on the southern side are broken. The urn is covered with a black-and-red ware lid. The fragments of the urn and rim were found inside the urn while removing the soil (Fig. 2.10).

No grave goods were found outside the urn. The urn has a secondary burial; only a few bone fragments and teeth crowns were found along with a black-and-red ware bowl.

Meg. 2, Urn-6

The urn is found at the center, closer to the southern section. The urn is made of red slipped ware and is traced at a depth of 0.86m. The urn is broken and cracks were noted on all sides of the urn. The urn is covered with a broken black-and-red ware lid, a symbol was noticed on the southeast side of the urn. Created using the nail impression technique while the clay is still wet. The symbol had two cone like projections placed in the neck area, below the projections, three curved lines flaring outwards on both sides, with a nail impression.

No grave goods were placed outside the urn. A black-and-red ware bowl is placed as a grave good inside the urn. The urn has a secondary burial. No bone fragments were found; one tooth crown was found inside the urn.

Meg. 2, Urn-9

The urn is made of red slipped ware and found in the southeastern part of the trench. The urn is traced at a depth of 0.45m. The urn is covered with a broken black-and-red ware lid. Four grave goods were placed outside the urn. It includes a black slipped ware pot, two black-and-red ware bowl and a miniature bowl made of black slipped ware.

Four grave goods were placed inside the urn. The inner grave goods include a pot and bowl. The urn has a secondary burial. Fragile Bones were traced at a depth of 0.68m from the rim of the urn. Few fragments of bones were collected.

A1

The trench A1 in Megalithic 2 is adjacent to ZA1 on the north and A2 on the south and B1 on the east. Two stone slabs placed diagonally from northeast to southwest are noted in the trench.

A2

The trench A2 in Megalithic 2 is adjacent to A1 on the north and B2 on the south. Stone slabs placed diagonally from northeast to southwest are noted in the trench.

B1

The trench B1 in Megalithic-2 is adjacent to B2 on the south, ZB1 on the north and A1 on the west. Two urns (Urn no.4 and 7) were found in the third layer of the trench.

Urn-4

The urn is found close to the northern section on northeastern side of the trench. The urn is traced at the depth of 0.94m. The urn is made of coarse

red ware and cracks were noted on all sides. The outer diameter of the urn is 0.52m and the inner diameter of the urn is 0.43m. The thickness of the urn rim is 0.045m. The urn is covered with a broken black-and-red ware lid. The lid is extended 15cm below the rim of the urn. The fragments of the lid were found while removing the soil inside the urn.

A decoration or mark is noted on the inner rim on northern part of the urn. The symbol is created by using a finger while it was wet. The mark had a deep impression and it represents a crescent.

A finger impressed design is found in the neck part and it is in a single circular row. Five grave goods were placed outside the urn. It includes a pot and a bowl. Only one grave good was placed inside the urn and it is a bowl. The urn has secondary burial. Fragments of cranium, teeth and bone fragments were found. The cranium is traced at the depth of 0.55m from the rim on northern part of the urn. The bones were fragile in condition.

Urn-7

The urn-7 is noted on the southeastern part of the trench. The urn is made of coarse red ware. The urn is covered with a broken black-and-red ware lid. No outer grave goods were found. An iron object is found inside the urn. The urn has a secondary burial. Few fragments of fragile bones were collected.

B2

The trench B2 is part of the Megalithic 2 present on the southeastern part of the mound. It is adjacent to the trench A2 on the west and the trench B1 on the north. Two layers were noticed in the trench. Humus and layer 1 are removed in recent times. Layer 2 is filled with cobbles and sand. Layer 3 is semi-compact and the soil is sandy silt. The urns were found in layer 3. Three urns (urn 2, urn 3 and urn 8) were found on the eastern side of the trench.

Urn-2

The urn is traced at a depth of 0.52m on the north east part of the trench B2 in Megalithic-2. Cobble packing is placed above the urn. The urn is found in layer-2. The urn is made of coarse red ware and cracks were noticed on all sides of the urn. The urn has a rim and a part of it is broken. The urn has a lid made of black-and-red ware. The lid is only present in the north east part of the urn. The lid is extended 5cm from the rim of the urn. The lid fragments were traced at the depth of 0.27m (from the rim) on eastern side of the urn. The top portion of the lid is slightly flat.

A design is noticed on the neck part of the urn. The design is created using *applique* technique by attaching a small coil of clay and pressing it with finger. Another symbol designed by *applique* technique is found in the eastern side of the urn on outer side. The symbol has three vertical lines slightly curved and two conical designs above the lines. No grave goods were placed outside the urn.

A black-and-red ware bowl is placed in the center of the urn in upside down position. Cracks were noticed all over the bowl. The bowl is traced at the depth of 0.37m from the rim of Megalithic-2 (B2) Urn 2. Urn 2 is a symbolic burial. No bones were found inside the urn.

Urn-3

The urn is traced at a depth of 0.66m on the southeastern corner of the trench B2 in Megalithic-2. Cobble packing is placed above the urn. The urn is found in layer-2. The urn is made of coarse red ware. The urn has a rim and the rim on the eastern side is mended. The outer diameter of the urn is 0.55m and the inner diameter of the urn is 0.45m. The thickness of the urn rim is 0.05m. The urn has a lid, made of black-and-red ware. The lid is only present in the western part of the urn. The black-and-red ware basin is used as a lid for the urn. The lid is extended 9cm from the rim of the urn. The fragments of the lid are found in cluster, traced at the depth of 0.92m.

A decoration is noticed on the neck portion of the urn and it was created by pressing the finger possibly the index finger while the urn was in wet condition. A symbol, designed by *applique* technique is found in the northern side of the urn on outer side. The symbol has four vertical lines slightly curved and two conical designs above the lines. The urn reached the bottom at the depth of 1.06m (from the rim). No grave goods were placed outside the urn. Fragments of black-and-red ware dish found in scattered, traced at the depth of 0.92m - 0.95m.

Urn-3 of Megalithic-2 is a secondary burial. Fragments of bones were found from 0.90m to 1.06m (from the rim). Fragment of a cranium is traced at a depth of 1m on the eastern side of the urn. The cranium is scattered. Fragments of cranium and other small bones were found inside the urn.

Urn-8

The urn is found in the southwestern corner of the trench. The urn is made of coarse red ware. The urn has a broken black-and-red ware lid. The urn is traced at the depth of 1.06m. The outer diameter of the urn rim is 0.63m and the inner diameter of the urn rim is 0.53m and the thickness of the urn rim is 5cm. A decoration created using nail impression is found in the neck part in a single row. A marking created using *applique* technique is noted on the southeastern side of

the urn on the outer side. The marking has two conical projection and three wavy curved lines.

Seven grave goods were placed outside the urn. It includes pot, bowl, dish, lid and a sword. Four grave goods were placed inside the urn. They include a bowl and iron objects. The urn has a secondary burial. Bones traced at the depth of 0.90m from the rim of the urn. Only a few fragments of the fragile bones were collected.

YC1

The trench YC1 is adjacent to YD1 on the west and XC1 on the south. Humus and 3 layers were identified. The humus is of recent activities and agricultural waste was found. Layer 1 is semi-compact and silty sand in texture. Layer 2 is filled with cobble packing and sand. Layer 3 is loose and sandy silt in texture. The urns were found only in layer 3. Seven urns were found in this trench, namely urn-25, 26, 27, 28, 37, 45 and 75. The urns were found below the cairn (cobble) packing.

Urn-25

The urn is found on the southeastern part of the trench. The outer diameter of the urn rim is 0.38m, the inner diameter of the urn rim is 0.34m and the thickness of the urn rim is 2cm. The urn is made of red slipped ware with black-and-red ware lid. The urn and the lid are broken and cracks were noted on all sides. An axe ring and a fragment of cranium along with fragmented bones were found inside the urn. It has a secondary burial.

Urn-26

The urn is of red slipped ware and is closed with upside down black-and-red ware basin. The black-and-red ware basin is broken. The diameter of the urn rim is 0.29m and the rims are completely crumbled. No grave goods were found on both outer and inner side of the urn. Two molar teeth are noticed at a depth of 0.41m (from the rim) in the inside bottom of the urn. The urn has a secondary burial.

Urn-27

The urn is made of coarse red ware and there is no lid at the top of the urn. The urn has two designs, one is *applique* and another is incised. One with a plus symbol encircled at the shoulder of the urn. A S-shaped symbol was identified on the inner surface of the rim, positioned on the western side of the urn, which was made before firing. The outer diameter of the urn rim is 0.57m and the inner diameter of the urn rim is 0.48m. Black-and-red ware fragments of the lid and cobbles were found while removing the soil inside the urn. No grave goods were

found inside and outside the urn. Two bone fragments of 2.5cm and 1.5cm were noticed at a depth of 0.88m in the base of the urn. The urn has a secondary burial.

Urn-28

The urn is found in the northeastern corner of the trench. The urn is made of red slipped ware. The urn has conical lid of red slipped ware. Grave goods were placed on both outer and inner sides of the urn. Few fragments of bones were collected. The urn has a secondary burial.

Urn-37

The urn is made of coarse red ware. The urn has a crumbled black-and-red ware lid. The outer diameter of the urn rim is 0.61m and the inner diameter of the urn rim is 0.51m. The thickness of the urn rim is 5cm. Eleven offering goods were placed around the urn on outer side. The outer grave goods include four black-and-red ware bowls, an axe, two ring stands, three red slipped ware pots and a black-and-red ware dish. A black-and-red ware bowl is placed inside the urn as inner grave good. The urn has a secondary burial. Skull, femur, teeth, finger bones, long bones and other bone fragments were found inside the urn.

Urn-45

The urn is found in the northeastern corner of the trench. The urn is made of coarse red ware. The urn has a crumbled black-and-red ware lid. The outer diameter of the urn rim is 0.51m and the inner diameter of the urn rim is 0.41m and the thickness of the urn rim is 5cm. A symbol is noted on the inside of the rim on the western side. The symbol is designed using a finger while the clay was wet. Fragments of the lid were found inside the urn while removing the soil. The bones were found scattered. Bones of a rodent are found inside the urn. The urn has a secondary burial. Bone fragments and teeth were found inside the urn.

Urn-75

The urn is found in the north western part of the trench. The urn is made of red slipped ware. The urn has a conical lid in red slip ware. The urn and the lid do not have a rim. The urn is traced at a depth of 1.38m. No Grave goods were placed on both outer and inner sides of the urn. The urn has a secondary burial. A meagre quantity of fragile bones was collected.

YD1

The trench YD1 is adjacent to YC1 on the east, YE1 on the west and XD1 on the south. Humus and 3 layers namely layer 1, layer 2 and layer 3 were noticed. The humus is of recent activities and agricultural waste was found. Layer 1 is

semi-compact and silty sand in texture. Layer 2 is filled with cobble packing and sand. Layer 3 is loose and sandy silt in texture. The urns were found in layer 3. Six urns were found in this trench namely urn-30, 31, 50, 55, 61 and 74. The urns were found below the cairn packing.

Urn-30

The urn is traced at a depth of 1.22m. The top of the urn is fully crumbled. The urn is made of black-and-red ware. Two pots made of red slipped ware are placed as outer grave goods. Two bowls and a cup made of black-and-red ware are placed as inner grave goods. The urn is a symbolic burial.

Urn-31

The urn is found in the middle of the eastern section. The urn is traced at a depth of 1.25m. The urn is of red slipped ware with the only double lid from the excavation. Basin made of black-and-red ware is used as a lid. The outer diameter of the urn rim is 0.24m, the inner diameter of the urn rim is 0.21m and the thickness of the urn rim is 1.5cm. A graffiti mark is noticed on the southern part of the urn. The graffiti mark represents a triangle with a line intersecting in the middle. A red slipped ware pot and a black-and-red ware bowl are placed outside the urn as grave goods. The urn is a symbolic burial.

Urn-55

The urn is made of red slipped ware. A basin made of black-and-red ware is used as a lid. The outer diameter of the urn rim is 0.35m, the inner diameter of the urn rim is 0.31m. And the thickness of the urn rim is 1.5cm. A graffiti mark is noted on the western side of the urn. The graffiti mark has two slanting lines and two parallel lines. Two red slipped ware pots and two black-and-red ware bowls were placed as grave goods on the outer side. Inside the urn nine grave goods were found, which include seven black-and-red ware bowls and two black-and-red ware dishes. The urn has a secondary burial. A skull is traced at a depth of 0.49m from the rim. Skull and other bone fragments were found inside the urn.

Urn-61

The urn is traced at a depth of 1.50m. The urn is made of red slipped ware. A broken black-and-red ware bowl is used as a lid. No grave goods were placed outside the urn. A black-and-red ware pot is placed inside the urn as inner grave goods. The urn is a symbolic burial.

Urn-74

The urn is made of red slipped ware and found in the northeastern corner of the trench. The urn is traced at a depth of 1.15m. The outer diameter of the urn

rim is 0.29m, the inner diameter of the urn rim is 0.25m and the thickness of the urn rim is 1.44cm. The urn has a rim without neck. A graffiti mark is noted on the outer side of the urn on the eastern side, 5cm below the rim. Lid fragments and fragments of the urn were found inside while removing the soil. A black-and-red ware bowl was placed on the eastern side of the urn as an outer grave good. A black-and-red ware bowl is placed inside the urn as inner grave good. The urn has a secondary burial. Meagre fragments of fragile bones were found.

YE1

The trench YE1 is adjacent to YD1 on the east and XE1 on the south. Humus and 3 layers were noticed. The humus is of recent activities and agricultural waste. Layer 1 is semi-compact and silty sand in texture. Layer 2 is filled with cobble packing and sand. Layer 3 is loose and sandy silt in texture. The urns were found in layer 3. Fourteen urns were found in this trench, namely urn-32, 42, 43, 44, 51, 53, 54, 57, 58, 59, 60, 62, 63 and 73. The urns were found below the cairn packing.

Urn-32

The urn is traced at a depth of 1.18m. The urn is made of red slipped ware and found in a crumbled state. The urn has a crumbled lid made of black-and-red ware. No grave goods were found outside. A black-and-red ware bowl and an iron chisel were placed inside as grave goods. The urn has a secondary burial. Only two teeth were found inside the urn.

Urn-43

The urn is found in the southeast quadrant of the trench. The urn is traced at a depth of 1.30m. The lid is absent. The urn is crumbled. Four grave goods were placed outside the urn. The outer grave goods include two black-and-red ware bowls, a miniature black-and-red ware bowl and a red slipped ware pot. Two black-and-red ware bowls and a black slipped ware pot with a conical base are placed inside the urn as inner grave goods. The urn is a symbolic burial. No bones were found inside the urn.

Urn-57

A small urn (pot) of red slipped ware with black-and-red ware basin used as a lid is found. A graffiti mark is noticed on the northeast side of the urn. The outer diameter of the urn rim is 0.38m, the inner diameter of the urn rim is 0.35m and the thickness of the urn rim is 2.5cm. Fourteen grave goods were placed outside the urn, which includes two red slipped ware pots, a black-and-red ware pot, a ring stand, two black-and-red ware dishes, three black-and-red ware bowls, two black-and-red ware miniature pots, a black-and-red ware miniature

bowl, a black slipped ware miniature ring stand and a black-and-red ware basin. Seven grave goods were placed inside the urn, which include two black-and-red ware pots, three black-and-red ware bowls and two chisels. The urn is a symbolic burial.

Urn-58

The urn is traced at a depth of 1.84m. The urn is made of coarse red ware. A broken black-and-red ware basin is used as a lid. The outer diameter of the urn rim is 0.52m, the inner diameter of the urn rim is 0.46m and the thickness of the urn rim is 4.2cm. A symbol was made using an *applique* technique is located on the shoulder of the urn. It represents two cone-like projections and two slightly curved lines (arc facing upwards) below the conical projection. A pot and two bowls were placed as grave goods on the outer side of the urn. A red slipped ware pot and two black-and-red ware bowls were placed as grave goods on the outer side of the urn. A black-and-red ware bowl is placed inside the urn as an inner grave good. The urn has a secondary burial. A few selected bones were placed inside the urn.

Urn-59

The urn was traced at a depth of 1.22m. The urn is made of red slipped ware. A black-and-red ware bowl with an everted rim, small neck, tapered body and flat base was used as a lid. No grave goods were found on both the outer and the inner sides of the urn. The urn is a symbolic burial.

Urn-60

The urn is traced at a depth of 1.30m. The urn is of red slipped ware. A broken black-and-red ware bowl is used as a lid. A ring stand is placed outside the urn as outer grave good. A black-and-red ware bowl and chisel are found inside the urn as inner grave goods. The urn is a symbolic burial.

Urn-62

The urn is made of coarse red ware and basin made of black-and-red ware is used as lid. The outer diameter of the urn rim is 0.51m and the inner diameter of the urn rim is 0.41m and the thickness of the urn rim is 4.5cm. Six grave goods were placed outside the urn. The outer grave goods include two black-and-red ware basins and two red slipped ware pots and a red slipped ware pot with black-and-red ware lid. Sixteen grave goods were placed inside the urn, which includes a red slipped ware pot, a black-and-red ware bowl, a miniature black-and-red ware pot, a black slipped ware miniature lid, two black slipped ware miniature bowls,

miniature ring stand, a ring stand, two black-and-red ware pots, two black slipped ware bowls, two miniature black slipped ware pots and two chisels. The urn has a secondary burial. The bones were scattered.

Urn-73

The urn (pot) is small in size and made of red slipped ware found in the southwest part of the trench. A crumbled black-and-red ware basin is used as a lid. The urn is also broken and partially exists. The urn was found at a depth of 2m. The outer diameter of the urn rim is 0.16m, the inner diameter of the urn rim is 0.12m and the thickness of the urn rim is 2cm. Four black-and-red ware bowls were placed as grave goods on the outer side. A black-and-red ware bowl is placed inside the urn as grave good. The urn has a secondary burial. Few fragile bone fragments were traced at 0.15 - 0.30m from the rim.

XC1

The trench XC1 is adjacent to YC1 on the north, XC2 on the south and XD1 on the west. Humus and 3 layers were noticed. The humus is of recent activities and agricultural waste was found. Layer 1 is semi-compact and silty sand in texture. Layer 2 is filled with cobble packing and sand. Layer 3 is loose and sandy silt in texture. The urns were found in layer 3. Seven urns were found in this trench, namely urns 1, 2, 3, 38, 49, 52 and 64. The urns were found below the cairn packing.

Urn-1

The urn is found in the northwestern part of the trench. The urn is made of red slipped ware. It is covered with a conical lid made of red slipped ware. The urn and the lid do not have a rim. Both are the same size and the portion from bottom to shoulder is only used. Nine grave goods were placed outside the urn. The outer grave goods include a red slipped pot, black-and-red ware bowl, ring stand were found on the outer side. No grave goods were placed inside the urn. The urn has a secondary burial. The bones found inside the urn are long bones, teeth, finger bones and other bone fragments.

Urn-2

Urn 2 is found close to the eastern section. The urn is made of coarse red ware and covered with black-and-red ware lid. A symbol was found inside the rim, created using finger while the clay was wet. The symbol represents a crescent or similar symbol is found in urn 4 of Megalithic 2. No grave goods were found outside the urn. Four black-and-red ware bowls were placed inside the urn.

The urn has a secondary burial. Few selected bones were placed inside the urn. The bones traced at a depth of 0.71m from the rim.

Urn-3

The urn is found in the southeast part of the trench, close to the south section. The urn is made of coarse red ware, partially broken and cracks were noted on all sides. The urn is covered with a black-and-red ware lid. No grave goods were found on the outside and inside of the urn. Fragments of the lid and urn were found while exposing the urn. The urn has a secondary burial. Few fragments of fragile bone were collected.

Urn-38

The urn is found in the southwestern part of the trench. The urn is made of coarse red ware, covered with a broken red slipped lid. The fragments of the lid were found while removing the soil. The outer diameter of the urn rim is 0.43m and the inner diameter of the urn rim is 0.35m. The thickness of the urn rim is 5cm. No grave goods were placed on both the outer and inner side of the urn. The urn has a secondary burial. Three long bones and a skull were found inside the urn.

XD1

The trench XD1 is adjacent to XC1 on the east, YD1 on the north and XD2 on the south and XE1 on the west. Humus and 3 layers were noticed. The humus is of recent activities and agricultural waste was found. Layer 1 is semi-compact and silty sand in texture. Layer 2 is filled with cobble packing and sand. Layer 3 is loose and sandy silt in texture. All the urns were found only in layer 3. Six urns were found in this trench, namely urns 4, 5, 6, 34, 36 and 47. The urns were found below the cairn packing.

Urn-4

The urn is traced at a depth of 1.38m on the southeastern corner of the trench. Cobble packing is placed above the urn. The urn is found in layer 3, made of coarse red ware and it is partially broken on the northern side; cracks were noticed on all sides of the urn. Only a small portion of the rim on the southwestern side is present. The urn is handmade and traces of coil making are observed on the top portion. The lid of the urn is not present. A large stone was present inside the urn and was later removed.

No grave goods were placed outside the urn. An offering pot is noticed at a depth of 0.19m (1.57m from the top) from the urn rim. The offering pot is made of red slipped ware with a conical base and is placed inverted. It is broken and

cracks were noticed in the pot. The pot is removed at a depth of 0.60m and 3 stones were also removed.

The burial is secondary in nature. 3 fragile bones were found inside the urn. The bones were traced at a depth of 0.62m. Two bones were found on the northwestern side of the urn; another two bones were found on the northeastern side of the urn. The length of the bone varies from 0.19m to 0.22m.

Urn-5

The urn is found near the western section of the trench. The urn is made of red slipped ware and traced at a depth of 2m. The outer diameter of the urn rim is 0.45m, the inner diameter of the urn rim is 0.38m and the thickness of the urn is 3.5cm. The urn is covered by a black-and-red ware basin as lid. Nineteen grave goods were placed outside the urn. The outer grave goods include black-and-red ware bowl, red slipped ware pot, ring stand, miniature black-and-red ware bowl, black-and-red ware basin. Sixteen grave goods were placed inside the urn. The inner grave goods include black-and-red ware bowl, miniature black and ware pot, miniature black-and-red ware bowl, ring stand and an iron object. The urn has a secondary burial. Only a tooth crown is found inside the urn.

Fig. 2.10 Thirumalapuram: Inner Grave Goods in Urn.5.

Urn-6

The urn is placed in the center of the trench. The urn is made of coarse red ware, it covered with a black-and-red ware lid. The outer diameter of the urn is 0.63m, the inner diameter of the urn is 0.50m and the thickness of the urn is 6.5cm. A symbol is noted on the southern part of the urn. The symbol is created using the *applique* technique. It has two conical like projection and six oblique lines were made below it. Another symbol is found inside the rim, which is created by a finger while the clay was wet.

Ten grave goods were placed outside the urn. The grave good includes red slipped ware pot, black-and-red ware dish, black-and-red ware bowl, black slipped pot with conical base and ring stand. Four offering goods were placed inside the urn which includes three black-and-red ware bowls and a chisel.

The urn has a secondary burial. Long bones such as femur bone, humerus bone, teeth and skull were present.

Urn-34

The urn is traced at a depth of 2m and it is made of coarse red ware. The urn has a lid made of black-and-red ware. The outer diameter of the urn rim is 0.53m, the inner diameter of the urn rim is 0.44m and the thickness of the urn rim is 4.5cm. A symbol created using a finger is found inside the rim. The symbol resembles the English alphabet 'V'. Another symbol created using *applique* technique is found outside the urn. The outer grave goods include pot, bowl and ring stand. A black-and-red ware bowl, tweezer and chisel were placed inside the urn as inner grave goods. The urn has a secondary burial. Bones were traced at a depth of 2.56m on the northwestern part of the trench. Long bones, cranium and teeth were placed inside the urn.

Urn-36

The urn is found in the northeastern part of the trench. The urn is made of red slipped ware. A basin made of black-and-red ware is used as a lid. Both the urn and lid were crumbled. Five bowls were placed inside the urn as grave goods. The urn is a symbolic burial.

Urn-47

The urn is made of coarse red ware. A basin made of black-and-red ware is used as a lid. On the outer surface of the neck, a single row of finger-impressed patterns forms a rope-like design. On the western side of the urn, below this line, a symbol possibly interpreted as a deer, based on its body structure. Just

above the deer, two small conical projections in *applique* design are present. A black-and-red ware bowl and chisel were placed inside the urn as grave goods. The urn has a secondary burial. Bones were traced at a depth of 0.68m from the rim. The identified bones include skull, femur, teeth and other bone fragments.

XE1

Trench XE1 is located adjacent to trench YE1 on the north, XD1 on the east, XE2 on the south and XF1 on the west. The stratigraphy of the trench revealed a humus layer followed by three distinct layers. The humus, indicative of recent activity, contained agricultural waste. Layer 1 is semi-compact with a silty sand texture, while Layer 2 consists of cobble packing mixed with sand, suggesting intentional placement, possibly for structural or ritual purposes. Layer 3 composed of loose, sandy silt and yielded significant findings. Four urns were found in this trench, namely urn-13, 14, 35 and 39. The urns were found below the cairn packing.

Urn-13

The urn was found in the southwestern corner of the trench. The urn is made of coarse red ware. Black-and-red ware basin is used as a lid. The urn is traced at a depth of 1.93m. The urn is full of cracks. Pot, bowl, ring stand and iron objects were placed as outer grave goods. A bowl is placed as an inner grave good. The urn has a secondary burial. Bone fragments and teeth were placed inside the urn.

Urn-14

The urn was found in the southwestern part of the trench, adjacent to Urn 13 on the west. The urn is made of coarse red ware and full of cracks. Black-and-red ware basin is used as a lid. The urn is traced at a depth of 2.03m. The outer diameter of the urn rim is 0.57m, the inner diameter of the urn rim is 0.47m and the thickness of the urn rim is 5.5cm. Pot, bowl, ring stand, miniature pot, miniature bowl, miniature ring stand and iron objects were placed as outer grave goods. Two bowls were placed as inner grave goods. The urn has a secondary burial. Few selected bones were placed inside the urn.

Urn-35

The urn was found in the southeastern corner of the trench. The urn is traced at a depth of 1.18m. The urn is made of red slipped ware and had a lid, made of black-and-red ware. Both the urn and the lid are crumbled. The twelve outer grave goods include dish, bowl, ring stand, pot, lid and pot with conical base. The thirteen inner grave goods include miniature pot, miniature bowl, miniature

ring stand, chisel, bowl and a dish on stand. The urn is a symbolic burial. No bone fragments were found.

Urn-39

The urn is made of coarse red ware with a black-and-red ware lid. The urn is found in the middle of the trench. The outer diameter of the urn rim is 0.56m the inner diameter of the urn rim is 0.48m and the thickness of the urn rim is 4.7cm. A symbol of two slanting line is noticed in the inner rim portion, which was made before firing. The nine outer grave goods include pot, bowl, basin and ring stand. Three bowls were found as inner grave goods. The urn has a secondary burial. Bone fragments were traced at a depth of 0.62m from the rim. Long bones and rib fragments were identified on the southern side of the urn. The skull was located at the centre, oriented towards the east and positioned upside down.

XF1

Trench XF1 is situated adjacent to trench XF2 on the south, XE1 on the east and XG2 on the west. The stratigraphy revealed a humus layer followed by three distinct archaeological layers. The humus, representing recent activity, contained traces of agricultural waste. Layer 1 is semi-compact with a silty sand texture, while Layer 2 comprises cobble packing mixed with sand. Layer 3 consists of loose, sandy silt and yielded the primary cultural material, including urns that were recovered from this layer. Seven urns were found in this trench, namely urn numbers 7, 11, 29, 72, 76, 77 and 78. The urns were found below the cairn packing.

Urn-7

A small urn (pot) made of red slipped ware is found on the southeastern part of the trench, close to the orthostatic structure. The urn is traced at a depth of 1.35m. The urn is broken and cracks were noted all over. The lid is absent. No grave goods were found on the both outer and inner side of the urn. Bone fragments were traced at a depth of 0.25m on the western side of the urn. Very few fragile bone fragments were collected.

Urn-11

The urn is placed in the southwestern part of the trench. The urn is traced at a depth of 1.42m made of coarse red ware and covered with black-and-red ware lid. The urn is crumbled and cracks were found all over. The outer diameter of the urn rim is 0.39m, the inner diameter of the urn rim is 0.31m and the thickness of the urn rim is 4cm. Fragments of the lid were found inside the urn along with pebbles of small and medium sizes. Decoration is found on the neck part. The decoration was created using finger impressions while the surface was

wet, forming a single continuous row. On the western side of the urn, a symbol is noticed, two cone like projections and three lines. Fragments of the lid and the urn were found while removing the inside soil of the urn.

No grave goods were placed on both the outer side and inner side of the urn. The urn has a secondary burial. Bones traced at a depth of 1.80m on the northern and western side of the urn. The skull is placed in the center and the long bones were placed on the western side of the urn. Cranium is traced at a depth of 1.91m. The bones were fragile.

Urn-29

The urn is found in the middle of the western section. The urn is traced at a depth of 1.35m and made of red slipped ware. It is broken and cracks were found all over. The urn is covered with a lid made of red slipped ware. No grave goods were found outside the urn. A bowl is found inside the urn. The urn has a secondary burial. Fragments of cranium, teeth and bones were found inside the urn. The cranium was traced at a depth of 1.68m (from the rim) on the north side of the urn.

Urn-72

The urn is placed in the northwestern part of the trench. The urn is made of red slipped ware. A decorative motif is present on the neck portion of the urn. On the northern side, figures resembling a tiger or leopard and a fox are depicted using dotted impressions. The urn is partially broken and cracks were found all over. A stone slab placed horizontally is seen above the urn. The stone slab is traced at a depth of 0.99m. The rim of the urn traced at a depth of 1.59m. No grave goods were placed outside the urn. One black-and-red ware bowl is placed inside the urn as a grave good. The urn has a secondary burial. A few selected bones and teeth were placed inside the urn. The bones were fragile.

Urn-76

The urn is made of red slipped ware and found on the northeastern corner part of the trench. The urn has lid made of black-and-red ware. A black-and-red ware bowl is placed as an outer grave good. The urn has a secondary burial. Skull, long bones and other bone fragments were found inside the urn.

Urn-77

The urn is placed in the middle very closer to the eastern section. The urn is traced at a depth of 1.50m. The top part of the red slipped ware urn is broken, only the bottom part is present. No grave goods were present outside the urn.

Fragments of the rim and urn were found while removing the soil. A black-and-red ware bowl is placed as an inner grave good. The urn is a symbolic burial. No bone fragments were found.

Urn-78

The urn is placed on the southeastern corner of the trench close to the eastern section. The urn is made of red slipped ware and traced at a depth of 1.43m. Only the bottom half of the urn is present. The top half of the urn is crumbled and found inside the bottom half. The urn is broken and cracks are seen all over. No grave goods were placed outside the urn. Six grave goods were placed inside the urn, which includes a pot, bowl, basin and chisel. The urn is a symbolic burial. No bone fragments were found inside the urn.

XC2

The trench XC2 is adjacent to XC1 on the north and XD2 on the west. Humus and 3 layers were noticed. The humus is of recent activities and agricultural waste was found. Layer 1 is semi-compact and silty sand in texture. Layer 2 is filled with cobble packing and sand. Layer 3 is loose and sandy silt in texture. Three urns were found in layer 3 of this trench namely urn 17, 46 and 48. The urns were found below the cairn packing.

Urn-17

The urn is found in the northwestern part of the trench. The urn is made of red slipped ware. A black-and-red ware basin is covered as a lid. The urn is traced at a depth of 1.63m. The outer diameter of the urn rim is 0.45m, the inner diameter of the urn rim is 0.35m. And the thickness of the urn rim is 5cm. below the neck, a decoration using finger impression is found in a single row. On the southern side of the urn, a symbol is noticed. The symbol is created using the *applique* technique while the urn was wet. The symbol has two cone like projection and two parallel lines on the sides.

No grave goods were placed outside the urn. A bowl is placed inside the urn as a grave good. The urn has a secondary burial. Few fragile bone fragments were found inside the urn.

Urn-46

The urn is found in the southwestern part of the trench. The urn is made of coarse red ware. In the neck portion, a decoration created using finger impression is found in a single row. A symbol created using *applique* technique is noted on the southern part of the urn. On the neck portion of the urn, a single row of decoration using finger impressions is observed. Additionally, a symbol crafted through the *applique* technique is present on the southern side of the urn. The

outer diameter of the urn rim is 0.58 m, the inner diameter of the urn rim is 0.46 m and the thickness of the urn rim is 6cm. A red slipped ware pot and a black-and-red ware bowl are placed as inner grave goods. The urn has a secondary burial. Few selected bones were placed inside the urn.

Urn-48

The urn is made of red slipped ware and found in the southeastern part of the trench. No grave goods were found in the outer and inner sides of the trench. The urn has a secondary burial. Few fragments of fragile bones were collected.

XD2

The trench XD2 is adjacent to XC2 on the east and XD1 on the north. Humus and 3 layers were noticed. The humus is of recent activities and agricultural waste was found. Layer 1 is semi-compact and silty sand in texture. Layer 2 is filled with cobble packing and sand. Layer 3 is loose and sandy silt in texture. Five urns were found in layer 3, namely urns 8, 9, 10, 33 and 65. The urns were found below the cairn packing.

Urn-8

The urn is made of red slipped ware and traced at a depth of 1.26m. The urn is smaller in size (pot) and crumbled in condition. Only half of the urn is present. The lid is absent. A red slipped ware pot and ring stand were placed as outer grave goods. A black-and-red ware bowl is placed inside the urn in the center. The urn is a symbolic burial.

Urn-9

The urn is found in the southwestern part of the trench. The urn is made of coarse red ware. The outer diameter of the urn rim is 0.57m and the inner diameter of the urn rim is 0.47cm. The thickness of the urn rim is 5cm. The urn has a black-and-red ware lid. The lid is broken and the fragments of the lid were found inside the urn. Four grave goods were placed inside the urn which includes pot and bowl. The urn has a secondary burial. Few bone fragments traced at a depth of 0.68m (from the rim) on the northeastern part of the urn.

Urn-10

The urn is found near to the eastern section of the trench. The urn is made of red slipped ware with conical base. The urn is covered with a conical red slipped pot. The urn and the lid do not have a rim. Both are the same size and the bottom to shoulder portion is only used. No grave goods were placed outside the urn. Two black-and-red ware bowls are placed as inner grave goods. The urn has a secondary burial. Three long bones and bone fragments were found.

Urn-33

The urn is made of coarse red ware and is traced at a depth of 1.93m. A black-and-red ware basin is used as a lid. Symbols were noticed on both the outer side of the urn and the inner side of the rim. Both symbols were found on the northeastern part of the urn. The symbol on the inside of the urn rim resembles a plus inside a circle. An *applique* designed plus inside a circle with a slanting line to its left, to circled symbol was noticed outside the urn. The nine outer grave goods include four black-and-red ware bowls, two ring stands, a black-and-red ware dish, a red slipped ware pot and a chisel. Fragments of the lid were found inside the urn. A black-and-red ware bowl is placed as an inner grave good. Bones were traced at a depth of 0.81m from southwest to northeast orientation in a slanting manner. Fragments of the cranium are noticed at a depth of 0.87m. Long bones like the femur, cranium, teeth and other bone fragments were found inside the urn.

Urn-65

The urn (pot) is smaller in size and made of red slipped ware. The urn is crumbled. Two black-and-red ware bowls were found inside the urn. No bone fragments were collected. The urn is a symbolic burial.

XE2

The trench XE2 is adjacent to XD2 on the east, XE1 on the north and XF2 on the west. Humus and 3 layers were noticed. The humus is of recent activities and agricultural waste was found. Layer 1 is semi-compact and silty sand in texture. Layer 2 is filled with cobble packing and sand. Layer 3 is loose and sandy silt in texture. Twelve urns were found in layer 3 this trench, namely urn-12, 15, 16, 39A, 56, 66, 67, 68, 69, 70, 71, 86 and 87. The urns were found below the cairn packing.

Urn-12

The urn is found in the center of the northern section. The urn is traced at a depth of 2.08m. The urn is made of coarse red ware. Cairn packing is filled above the urn. The urn is covered with a broken black-and-red ware lid. The outer diameter of the urn rim is 0.46m, the inner diameter of the urn rim is 0.38m and the thickness of the urn rim is 3.5cm. A symbol is located on the exterior of the urn, toward the northwestern side. The symbol is created using the *applique* technique. The symbol had two conical projections and two vertically curved lines seen between the conical projections. In the neck portion just below the rim of the urn finger impression is found in a single circular row. The fifteen outer

grave goods include two red slipped ware pots, three black-and-red ware bowls, two black-and-red ware dishes, a black slipped ware dish, two ring stand, a black slipped ware lid, a black-and-red ware basin and iron objects like a chisel and axe. Two black-and-red ware bowls are placed as inner grave goods. The urn has a secondary burial. Long bones like the femur, teeth and bone fragments were found inside the urn.

Urn-15

The urn is traced at a depth of 1.43m. The urn is small in size and made of coarse red ware. Two red slipped ware pots and a miniature pot of black slipped ware are placed as outer grave goods. Two black-and-red ware bowls, a chisel and a miniature black slipped ware pot are placed as inner grave goods. No bone fragments were found inside the urn. The urn is a symbolic burial.

Urn-16

The urn is traced at a depth of 1.42m. The urn is made of red slipped ware. The urn is crumbled completely and the base is slightly intact. No grave goods were found outside the urn. Two black-and-red ware bowls and a dagger are found inside the urn. The bone fragments were found in a meagre quantity. The urn has a secondary burial.

Urn-39A

The urn is traced at a depth of 1.63m. The urn is made of course red ware with a black-and-red ware lid. Both the urn and the lid were crumbled. A red slipped pot is placed as an outer grave good and a black-and-red ware bowl is placed as an inner grave good. The urn is a symbolic burial.

Urn-56

The urn is found in the southwestern part of the trench. The urn is traced at a depth of 1.64m. The urn is made of coarse red ware and covered with a lid. The lid is made of red slipped ware and the lid has a bottomless rim. The lid is broken and cracks are seen all over the lid. The outer diameter of the urn rim is 0.47m, the inner diameter of the urn rim is 0.41m and the thickness of the urn rim is 3cm. Beneath the rim, a decorative motif comprising two rows of finger-impressed marks is present. The eight outer grave goods include two red slipped ware pots, a black slipped ware pot, three ring stands, a black-and-red ware bowl and miniature black-and-red ware bowl. The three inner grave goods include a ring stand, a red slipped ware pot and black-and-red ware bowl. The urn has a secondary burial. Bones were traced at a depth of 0.47m (from the rim) on the north and northwest sides of the urn. Skull, long bones like the femur and bone fragments were found inside the urn (Fig. 2.11).

Fig. 2.11 Thirumalapuram: Inner View of bones and bowl in Urn-56. XE2

Urn-66

The urn is made of coarse red ware and a black-and-red ware basin is used as a lid. The urn is traced at a depth of 1.70m. The outer diameter of the urn rim is 0.57m, the inner diameter of the urn rim is 0.49m and the thickness of the urn rim is 4.5cm. A row of dotted lines is noted below the rim on the outer side. No grave goods were placed outside the urn. A black-and-red ware pot and black-and-red bowl. A single row of dotted lines, created by finger impressions, is visible just beneath the rim on the exterior surface. A bowl was placed inside the urn. The urn has a secondary burial. Fragments of bones and teeth were found inside the urn.

Urn-68

The urn is made of red slipped ware and a black-and-red ware basin is used as a lid. The urn was traced at a depth of 1.90m. The outer diameter of the urn rim is 0.30m, the inner diameter of the urn rim is 0.25m and the thickness of the urn rim is 2.5cm. The urn has a graffiti symbol on the outer side. No grave goods were placed outside the urn. Seven inner grave goods include three black-and-red ware bowls, a black slipped carinated pot, a miniature black-and-red ware bowl, a chisel and a dagger. The urn has a secondary burial. Fragments of cranium were found at the bottom of the urn.

Urn-69

The urn is traced at a depth of 1.94m. The urn is made of coarse red ware and a broken black-and-red ware basin is used as a lid. The outer diameter of the urn rim is 0.47m, the inner diameter of the urn rim is 0.42m and the thickness of the urn rim is 3.5cm. Beneath the rim, a decorative motif comprising two rows of finger-impressed marks is present. The fragments of the lid were found while exposing the soil inside the urn. No grave goods were placed outside the urn. A black-and-red ware bowl is placed as inner grave good. The urn has a secondary burial. Few bone fragments were found inside the urn.

Urn-70

The urn (pot) is made of red slipped ware, with an incised design found on the belly part. A broken black-and-red ware basin is used as a lid. The urn is found in the northwestern part of the trench. The urn was traced at a depth of 1.85m. The outer diameter of the urn rim is 0.28m, the inner diameter of the urn rim is 0.24m and the thickness of the urn rim is 2cm. The twelve outer grave goods which include five black-and-red ware bowls, two ring stands, a black-and-red ware miniature bowl, a black slipped ware lid, a red slipped pot, a black-and-red ware dish and a dagger. A black-and-red ware bowl and a chisel are placed as inner grave goods. The urn has a secondary burial. Few fragments of fragile bones were found inside the urn.

Urn-71

The urn is found in the northeastern part of the trench. The urn is made of red slipped ware. A crumbled black-and-red ware basin is used as a lid. The urn was traced at a depth of 1.90m. The outer diameter of the urn rim is 0.31m the inner diameter of the urn rim is 0.26m and the thickness of the urn rim is 2.5cm. The sixteen outer grave goods include five black-and-red ware bowls, two ring stands, a miniature ring stand, two red slipped ware pots, two black-and-red ware pots, two black-and-red ware basins, a black-and-red carinated dish and a chisel. Five black-and-red ware bowls were placed as inner grave goods. The urn has a secondary burial. Bone fragments were traced at a depth of 0.23m from the rim and the skull was traced at a depth of 0.44m from the rim. Other than that, fragments of bones were also found inside the urn.

Urn-86

Two black-and-red ware basins are used as an urn. No grave goods were found on the outer side of the urn. The outer diameter of the basin is 0.41m,the

inner diameter of the basin is 0.39m and the thickness of the basin is 1cm. Inside the urn, skull, teeth and bone fragments were found. The urn has a secondary burial.

Urn-87

The urn is made of red slipped ware with a broken black-and-red ware lid. Fragments of the rim are found while removing the soil. The urn is traced at a depth of 2.07m. The outer diameter of the urn rim is 0.23m, the inner diameter of the urn rim is 0.18m and the thickness of the urn rim is 2.5 cm. No grave goods were placed outside the urn. A pot and an iron chisel were placed as inner grave goods. The urn is a symbolic burial.

XF2

The trench XF2 is situated adjacent to XE2 on the east, XF1 on the north and XG2 on the west. Humus and three distinct layers were identified. The humus is associated with recent human activities and remnants of agricultural waste were present. Layer 1 is semi-compact and has a silty sand texture. Layer 2 consists of cobble packing mixed with sand. Layer 3 is loose in composition, with a sandy silt texture. A total of nine urns were recovered from layer 3 of this trench: urns 18, 19, 20, 21, 22, 82, 83, 84 and 85. All the urns were located beneath the cairn packing (Fig. 2.12).

Fig. 2.12a Thirumalapuram: Burial identification mark and working pit mark of XF2

Fig. 2.12b Thirumalapuram: Burial identification mark and working pit mark of XF2

Urn-18

A small red-slipped ware urn was discovered in the northeastern corner of the trench. A black-and-red ware basin served as its lid. On the belly portion of the urn, an incised decorative motif was observed, featuring between two lines nail impressions found on it. Outside the urn, a black-and-red ware bowl was placed as a grave good. Inside the urn, seven grave goods were recovered: five black-and-red ware bowls, one black-and-red pot and a chisel. This urn represents a symbolic burial, as it is devoid of bone fragments.

Urn-19

The urn is found in the northwestern part of the trench. The urn is made of coarse red ware. The urn has a crumbled lid made of black-and-red ware. The outer diameter of the urn rim is 0.50m, the inner diameter of the urn rim is 0.40m and the thickness of the urn rim is 5cm. A black-and-red ware basin, a black-and-red ware bowl, a red slipped ware pot and a chisel were placed as outer grave goods. Inside the urn, five black-and-red ware bowls were placed as inner grave goods. The urn has a secondary burial. A fragment of skull and other bone fragments were found inside the urn.

Urn-20

An urn was discovered in the northeastern part of the trench, accompanied by a broken black-and-red ware lid. The rim of the urn measures 0.71m in outer

diameter and 0.58m in inner diameter with a thickness of 6.5cm. Just below the neck, a decorative band made of finger impressions was observed, forming a single row. On the southwestern side on the exterior portion, a symbol created using the *applique* technique was identified, resembling the English alphabet 'U'. Additionally, two distinct symbols were found on the inside rim at the southeastern section: one resembles the English letter 'Z' and the other represents the Tamil character *'Akk',* formed by three dots arranged in a triangular pattern. The eight outer grave goods include a red slipped ware pot, a black-and-red ware pot, a black slipped ware pot with conical base, two black-and-red ware bowls, a black-and-red ware dish and a chisel. Inside the urn, a red slipped ware pot with a lid is present, it continued up to the bottom of the urn. At the same level, another red slipped ware pot and a chisel were also found. Inside the pot, a bowl and a few bone fragments were found. Below the offering pot, another pot is found in fragments. The urn has a secondary burial. Bone fragments and teeth were found.

Urn-21

The urn is found in the southwestern part of the trench. The urn is made of coarse red ware, it has a broken black-and-red ware lid. The outer diameter of the urn rim is 0.51m, the inner diameter of the urn rim is 0.42m and the thickness of the urn rim is 4.5cm. A symbol is observed on the inner side of the urn's rim, specifically on the northwestern portion. It is created using an incised technique, likely made with a finger while the clay was wet. The symbol consists of a slightly upward-curving line with a vertical stroke intersecting at the centre, resembling the Tamil letter '*ய*' (ya). A single row of dotted lines, incised technique created by finger impressions, is visible just beneath the rim on the exterior surface. Pot, bowl and ring stand were placed outside the urn as outer grave goods. The urn is a primary burial (Fig. 2.13). The bone was traced at a depth of 0.58m. It is the only primary burial found in the excavation. The skeleton was positioned in a crouched or squatting posture, with the head oriented toward the northwest and facing southeast. The skeletal remains are largely intact, though in a fragile state, with some elements possibly disarticulated due to natural decay processes.

Urn-22

The urn is found in the southeastern corner of the trench. The urn is made of coarse red ware and is traced at a depth of 1.66m. The outer diameter of the urn rim is 0.54m, the inner diameter of the urn rim is 0.44m and the thickness of the urn rim is 5cm. A broken black-and-red ware basin is covered as a lid. The

fragments of the lid were found inside the urn while removing the soil. The seven outer grave goods include two black-and-red ware bowls, two red slipped ware pots, two black-and-red ware basins and a ring stand. The urn has a secondary burial. Bone fragments were traced at a depth of 0.57m from the rim. The bones were fragile and scattered.

Fig. 2.13 Thirumalapuram: Inner view of Primary burial with BRW bowl in Urn.21, XF2.

Urn-82

The urn is found in the northwestern corner of the trench close to Urn-20. The outer diameter of the urn rim is 0.40m, the inner diameter of the urn is 0.24m and the thickness of the urn rim is 2cm. A symbol crafted using the *applique* technique appears on the outer surface of the urn, specifically on the northeastern section. It comprises two conical projections and three vertical lines. The outer right and left lines gently curve at the sides, while the central line remains straight. On the neck of the urn, a decorative pattern made with finger impressions forms a single row. On the belly portion of the urn, a row of similar designs was created using the *applique* technique. The three outer grave goods include a black slipped ware pot, a ring stand and a black-and-red ware bowl (Fig. 2.14). The five inner grave goods include a black slipped ware pot with a conical base, two black-and-red ware bowls and two black-and-red ware miniature bowls. The urn is a symbolic burial.

Fig. 2.14 Thirumalapuram: General view of Urn 82, XF2

Urn-83

The urn is traced at a depth of 1.55m. The urn is made of red slipped ware, only the bottom portion of the urn is present. The urn has a lid. The fragments of the lid and urn were found inside the urn. Two black-and-red ware bowls were placed inside the urn as grave goods. The urn is a symbolic burial.

Urn-84

The urn is traced at a depth of 1.65m. The urn is made of red slipped ware, only the bottom half of the urn is present. No grave goods were present on the outer and inner sides of the urn. The urn has a secondary burial. Fragments of skull and other fragile bone fragments were found inside the urn.

Urn-85

The urn is traced at a depth of 1.65m. The urn is made of red slipped ware, only the bottom half of the urn is present. A red slipped pot with a conical base is placed as an outer grave good. The four inner grave goods include three black-and-red ware bowls and a chisel. The urn has a secondary burial. A meagre quantity of fragile bones was found.

XG2

The trench XG2 is adjacent to XG1 to the north and XF2 to the east. Humus and three layers were identified. The humus results from recent activities and agricultural waste was found. Layer 1 is semi-compact and has a silty sand texture. Layer 2 is composed of cobble packing and sand. Layer 3 is loose and has a sandy silt texture. Four urns were exposed in layer 3 of this trench, namely Urn-23, Urn-24, Urn-40 and Urn-41. The urns were located beneath the cairn packing.

Urn-23

The urn is made of red slipped ware and it is completely crumbled. The urn is traced at a depth of 1.25m. The urn is covered with a red slipped ware lid. A ring stand is placed outside the urn as a grave good. The urn has a secondary burial. Few bone fragments, teeth crown and teeth with roots were found inside the urn.

Urn-24

The urn is made of coarse red ware and is traced at a depth of 2.10m. The urn is found close to the middle of the eastern section. A black-and-red ware basin is used as a lid. A symbol is noticed inside the rim of the urn. It was created by the finger while the urn was still wet. The symbol resembles the letter 'U' of the English alphabet. The four outer grave goods include a black-and-red ware basin, black slipped ware lid, black-and-red ware pot and red slipped ware pot. A black-and-red ware bowl is placed as an inner grave good. The urn has a secondary burial. Bones traced at a depth of 0.52m (from the rim) on the northeastern side of the urn. The bones identified in the urn are cranium, leg bone, hand bone (ulna), pelvic bone, teeth with molars, jaw bone and vertebra.

Urn-40

The urn is found on the southeastern side of the trench. The urn is made of red slipped ware and a basin made of black-and-red ware is used as a lid. The urn was traced at a depth of 1.50m. The outer diameter of the urn rim is 0.54m, the inner diameter of the urn rim is 0.44m and the thickness of the urn is 4.5cm. A symbol is noticed inside the rim of the urn. It was created by the finger while the urn was still wet. The symbol resembles, English alphabet 'U' drawn one inside another. In the neck part of the urn, a decoration created using a finger impression is found in a single circular row. A crumbled red slipped ware pot is placed as a outer grave good. The five inner grave goods include three black-and-red ware bowls, a red slipped ware pot and a black-and-red ware pot. The urn has a secondary burial. Skull, long bones like femur, tibia, vertebrate, ribs and other bone fragments were found inside the urn.

Urn-41

The urn is found on the northeastern side of the trench. The urn is made of coarse red ware and a basin made of black-and-red ware is used as a lid. The urn was traced at a depth of 1.84m. The outer diameter of the urn rim is 0.67m, the inner diameter of the urn rim is 0.48m and the thickness of the urn is 5cm. A symbol is noticed on the inner side of the urn rim on the southern part. The symbol resembles a circle.

In the neck part of the urn, a decoration created using finger impressions is found in a single row. The four outer grave goods include two black-and-red ware pots, black-and-red ware dish and a red slipped ware pot. The five inner grave goods include three black-and-red ware bowls, a black-and-red ware pot and a chisel. The urn has a secondary burial. Bone was traced at a depth of 0.67m from the rim, on the western side of the urn. The skull is traced at a depth of 0.70m, placed on the northeastern part of the urn. Skull, long bones and other bone fragments were found inside the urn.

YJ2

The trench YJ2 is adjacent to YJ1 on the south, YJ2 on the east and YJ3 on the north. Humus and three layers were noticed. The humus is associated with recent activities and agricultural waste was found. Layer 1 is semi-compact with a silty sand texture. Layer 2 is filled with cobble packing and sand. Layer 3 is loose and has a sandy silt texture. Two urns were found layer 3 in the trench, namely Urn-80 and Urn-81. The urns were found below the cairn packing.

Fig. 2.15 Thirumalapuram: Arial view of Urn 81 with offering goods, YJ2

Urn-81

The urn is made of coarse red ware, found in the centre of the trench with fifty grave goods placed outside the urn (Fig. 2.15). It is the only urn with a greater number of outer grave goods. The outer grave goods include pots, bowls, ring stands, basins and iron objects. One of the graves good was a red slipped pottery had a graffiti symbol. The urn has lid made of coarse red ware with matt impression on the top. Stones, cobbles and fragments of lid were removed while exposing the urn. Three small circular gold rings were found inside the urn at a depth of 0.49m from the rim. The diameter of the gold ring is 4.8mm and thickness is 0.2mm. The gold ring weighs less than 1mg. Besides ring, a bowl and fragments of bones were found inside the urn. The urn has a secondary burial.

YJ3

The trench YJ3 is adjacent to YJ2 on the south and YI3 on the west. Humus and three layers were noticed. The humus is associated with recent activities and agricultural waste was found. Layer 1 is semi-compact with a silty sand texture. Layer 2 is filled with cobble packing and sand. Layer 3 is loose with a sandy silt texture.

A pit is traced in layer 3 on the northeastern corner of the trench. Fragments of black-and-red ware and black ware were found. Two circular beads made of bone with a hole in the middle are found at a depth of 2.45m, one broken and the other in good condition, the diameter of the bead is 2.9cm, the thickness is 0.35cm and the diameter of the hole inside the bead is 0.55cm. Alongside a chisel is also found at a depth of 2m.

Ceramics

The pottery served as the index for various cultures and civilizations. The pottery making underwent many steps and techniques such as beating, surface treatment, firing and decorations, shapes etc. based on those varieties, names that had been given, such as red ware, red slipped ware, black -and- red ware, all black ware, black polished ware, black on red ware, brown slipped ware, coarse red ware, brown ware, rouletted ware, russet-coated painted ware etc. Effects found in the pottery were categorized into *applique* and incised designs. Urn and some potteries have many decorations such as incised patterns, *applique* designs, thumbed and nail impression marks. The excavation Thirumalapuram brought to light different varieties of ceramics in the form of graves and grave goods. The types include white painted black -and- red ware, white painted black ware, red ware, red slipped ware, black -and- red ware, all black ware, black polished ware and coarse red ware.

The excavation also revealed different types of burials. Most of the burials were made of coarse red ware, followed by red slipped ware and black-and-red

ware. Only one is made of black -and- red ware (Urn- 54). The urns were covered with lids. The different types of ware were used as lids, which are red slipped ware with conical bottoms, without rim, black -and- red ware basins covered as lids and coarse red ware lids with matt impression bottom. The lid with a mat impression is found at the bottom of the urns 47 and 82. The grave goods were present on both the outer and inner sides of the urn. The ceramic grave goods found in the burials include pots, bowls, ring stand, basins, dishes, miniature pots, miniature bowls, miniature ring stands and dish-on-stand. The pots were found in red slipped ware and black slipped ware, some with a conical base. Miniature pots were found in black -and- red ware and black slipped ware. The bowls were mostly found only in black-and-red ware and some in black slipped ware. The basin was found in black-and-red ware. The dish is found only in black -and- red ware. The ring stands and miniature ring stands are made of black slipped ware. Only one dish-on-stand in black -and- red ware is found in Urn 35 as inner grave goods. The lids were found in black slipped ware and one lid was found in red ware in Urn 34 as outer grave goods.

Painted wares

Black-and-red ware, black ware and black slipped ware types of pottery have white painted designs. They are generally applied to bowls, pots and lids. Among these, bowls are a good number of painting designs. The designs are mostly displaying dots, dashes or oblique patterns executed in white colour. In a bowl, paintings are normally executed just below the rim portion. . The grave goods found in Urn 5, Urn 6 and Urn 79 have white painted potteries. However, the paintings were faded in some grave goods. The white painted potteries in Tamil Nadu were first reported at T. Kallupatti. The other important excavated sites which yielded white painted potteries in this region are Adichanallur, Sivagalai, Thulukkarpatti and Korkai. covering a wider period from Iron Age to the Early Historic.

Symbols and portraits

The symbols on the urns are one of the very peculiar features of the Thirumalapuram urns. The symbols were found on both the outer and inner sides of the urns (Figs. 2.16-2.29). In some urns, it is only noted on either the outer side or the inner side. In some urns, the symbol is found on both the inner and outer sides. The symbols on the inner side are created using fingers while the urn is still in a leather condition. The symbols found on the outer side are created using the *applique* technique. In this technique, clay is placed on the shoulder portion of the outer surface of the finished urn and pressed with fingers based on the designs. In Urn-34, nail impression is noted instead of a finger impression. In Urn-58 both finger and nail impressions were seen on the curved lines. In Urn-33, an *applique* mark representing a plus mark inside a circle with a slanting line to its left is noticed outside the urn. In Urn-47, an animal figurine, possibly a deer, is

seen. Above the figure, two conical-like projections are noticed. The two conical-like projections are noted in all the symbols found on exterior surface of the urn. The symbols found inner surface of the rim resemble alphabet 'U', a crescent or a curve, alphabet 'V', plus mark inside a circle, a circle and two slanting lines.

Two urns were decorated on the shoulder portion with a dotted design. The Urn 72 found on the northern side of the trench had figures resembling a tiger or leopard and a fox are depicted (possibly) using dot impressions. The Urn 1 in Megalithic-2 is made of red slipped ware had a dotted design representing a human, a mountain, deer and a tortoise.

Fig. 2.16 Thirumalapuram: The symbol depicted in Urn-12

Fig. 2.17 Thirumalapuram: The symbol depicted in Urn 17, XC2

Fig. 2.18 Thirumalapuram: The symbol depicted in Urn.20, XF2

Fig. 2.19 Thirumalapuram: The symbol depicted in Urn.6, XD1

Fig. 2.20 Thirumalapuram: The symbol depicted in Urn.47, YD1

Fig. 2.21 Thirumalapuram: The symbol depicted in Urn 53, YE1

Fig. 2.22 Thirumalapuram: The symbol depicted in Urn.72, XF1.

Fig. 2.23 Thirumalapuram: The symbol depicted in Urn.33 XD2

Fig. 2.24 Thirumalapuram: The symbol depicted inside the rim Meg.-2 urn 4.

Fig. 2.25 Thirumalapuram: The symbol depicted inside the rim urn 20.

Fig. 2.26 Thirumalapuram: The symbol depicted inside the rim urn 40.

FFig. 2.27 Thirumalapuram: The symbol depicted inside the rim urn 41.

Fig. 2.28 Thirumalapuram: The symbol depicted inside the rim urn 33.

Fig. 2.29 Thirumalapuram: The symbol depicted inside the rim urn 53

Graffiti marks

The excavation yielded 6 Urn burials (Urn no. 31, 55, 57, 68, 74 and 84) bearing graffiti marks which are all written engraved on the shoulder portion of the urns. All the graffiti marks were found in red slipped ware urns (Fig. 2.30). Urns 31 and 57 were symbolic burials and the rest were secondary burials. Urns 55 and 57 have the same graffiti.

Fig. 2.30 Thirumalapuram: The graffiti mark depicted in Urn.55,57,68

Antiquity

The excavation yielded 78 antiquities made of bone, gold and iron (Fig. 2.31). The objects made of iron were dominant followed by gold and bone.

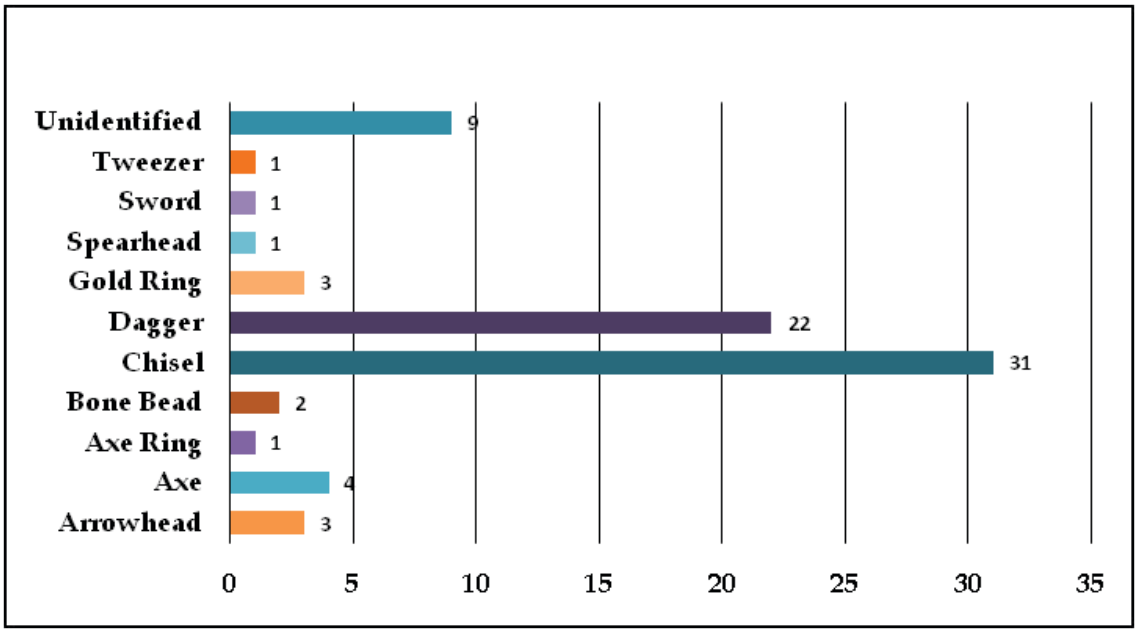

Fig. 2.31 Thirumalapuram: The distribution of Antiquities

Bone Objects

Two circular beads made of bone with a hole in the center are found in the trench YJ3 at a depth of 2.45m (Fig. 2.32). One bead is in a good condition and the other one is broken. The diameter of the bead is 2.9cm and the thickness is 0.35cm. The diameter of the hole is 0.55cm.

Fig. 2.32 Thirumalapuram: Circular Bone Bead, YJ3.

Gold Objects

Three tiny gold rings were found inside Urn 82 at the depth of 0.49 meter from the rim (Fig. 2.33). The diameter of the gold ring is 4.8 mm and thickness is 0.2 mm. The gold ring weighs less than 1mg. In Tamil Nadu, gold objects were found in burial sites like Adichanallur, Sivagalai, Thandigudi, Kodumanal and Suttukeni.

Fig. 2.33 Thirumalapuram: Tiny gold ring collected from inside the Urn no. 82

Bronze Object

A bronze bowl has been collected from an urn burial no.81 in the trench YJ2. It is probably a high-tin bronze bowl subject to future scientific analysis. Such bowls were reported at Kodumanal and Kongalnagaram.

Fig. 2.34 Thirumalapuram: Urns along with gold rings, iron implements and offering pots, Trench YJ2

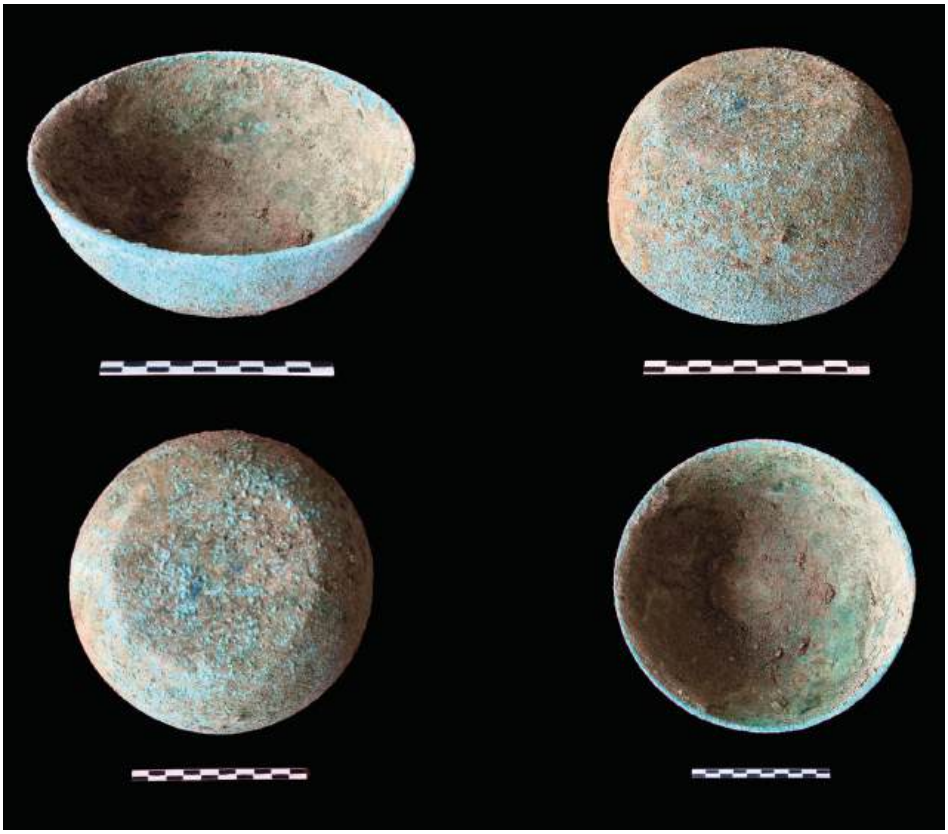

Fig. 2.35 Thirumalapuram: High-tin bronze bowl

Iron Objects

A total of 73 iron objects were found in the excavation. The iron objects were placed as grave goods on the outer and inner sides of the urn. The various types of iron objects found in the burial include arrowheads, axes, axe rings, chisels, daggers, spearheads, swords, tweezers and a few unidentified objects. Chisels were dominant and were found in different sizes, followed by dagger, unidentified objects, axe, arrow head, axe ring, sword, spearhead and tweezer.

Fig. 2.36 Thirumalapuram: Iron Arrowheads

Arrowhead

Arrowhead is an object made of bone, metal or stone that has been formed as the pointed end of an arrow for penetration. Most often, arrowheads were placed in a slot in the shaft, tied and then fixed with resin. Arrowheads serve as evidence for archery since the wooden part of the shaft of the arrow and bow rarely survive. Three arrowheads were found in Megalithic-1, quadrant-3 (Fig. 2.34). The arrowheads were rusted and broken. Two of the arrowheads had the remains of wood fiber in it.

Axe

An axe is a flat, heavy cutting tool of stone or metal in which the cutting edge is parallel to the haft and which might have the head and handle in one piece. Its main function was for woodworking (hewing, cleaving or chopping trees and other), but it was also used as a weapon of war. Based on the material and hafting method axes are of many types. There are many forms of axes, depending on the different materials and methods of hafting.

Four axes were found in the excavation (Fig. 2.35). The axes were found only outside of the urn.

Axe Ring

An axe ring is found in the trench XE-2, Urn 12 at a depth of 2.20 meter. At the same depth, an axe is also found. A similar ring alongside an axe was discovered at Adichanallur and Sivagalai.

Chisel

Fig. 2.37 Thirumalapuram: Iron Chisel

Chisels are made out of iron. It has a tapered blade at one end (possibly for cutting or carving) and a flattened butt at the other (likely for striking). They have a rectangular shape with broad rectangular tangs and

a narrow blade. Some were possibly used with a wooden handle. A total of 31 chisels in various sizes were found. Most of the chisels were found inside the urn (Fig. 2.36)

Dagger

A dagger is a short, double-edged stabbing weapon, usually designed for close combat. Although smaller than a sword, it has a pointed blade and a central grip. One particular iron dagger, found at the site, is heavily corroded due to prolonged burial. It has a tapered blade and a narrow tang, suggesting it was originally attached with a handle. Daggers were commonly used during the Iron Age and Early Historic periods, serving not only as practical weapons but also as ceremonial or symbolic objects. 22 daggers were found in the excavation (Fig. 2.37). The daggers were the second dominant grave good made of iron identified in this excavation. In the trench YI-1, Urn no.79 a total of 3 daggers were found inside the urn.

Fig. 2.38 Thirumalapuram: Iron Dagger

Spearhead

A spearhead is a thrusting blade mounted on a long shaft as a weapon for war or hunting. A spearhead found in the trench XE-2, urn no.12 is rusted and broken. The spearhead is placed as an outer grave good.

Sword

Swords are a weapon evolved from daggers, becoming longer and made with different grips. The sword was used for slashing and thrusting. It has a broader

blade than a rapier, plus a flanged hilt. Single-edged swords are rare and they are more often called sabers or falchions. Sword classifications are based on the form of the hilt and the shoulder.

A sword is found in Megalithic-2 Urn no.8 at a depth of 1meter. The sword was a outer grave good.

Tweezer

Tweezers are small, hand-held tools used to grasp and manipulate objects that are too tiny or delicate for fingers to handle directly. It has two slender arms joined at one end, with tips that meet when squeezed. A tweezer is found inside urn no.33 in trench XD2 at a depth of 0.70 meters from the rim of the urn. The tweezer is rusted and broken.

Unidentified

Nine iron objects were in crumbled state making it unidentifiable.

Cultural Period

Based on the cultural materials obtained from the excavation, cultural periods and dates are tentatively proposed. The urn burials in Thirumalapuram relatively date from Iron Age to Early Historic Period. The site has yielded fine variety of black-and-red ware, black polished ware, black ware, red slipped ware, white-painted black-and-red ware and white-painted black ware. In addition, graffiti bearing potsherds, urns and iron antiquities with symbols were identified. Based on these findings, the site is tentatively dated to the Iron Age. Similar ceramic collection and iron objects were found at Sivagalai and Adichanallur, sites dated to 3345 BCE and 2517–2513 BCE, respectively. Thus, the site of Thirumalapuram is also tentatively placed in the early to mid-3rd millennium BCE.

Conclusion

Thirumalapuram excavation throws new light on the study of burial types and urns alongside their symbols or markings. The excavation revealed different types of burials, which helps to understand the social life, its hierarchy and burial practices of the people.

Acknowledgement

The excavation at Thirumalapuram in Tenkasi district was carried out under the guidance of Thiru. T. Udhayachandran, I.A.S., Principal Secretary and Commissioner, Dr. R Sivanandham, Joint Director, Tamil Nadu State Department of Archaeology. I would also like to extend my thanks to Prof. K. Rajan, Academic and Research Advisor, TNSDA and V.P. Yathees Kumar, Deputy Director, Tamil Nadu State Department of

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Excavations at Kilnamandi

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Introduction

Kilnamandi (Lat. 12°22'36.11"N; Long. 79°31'24.56" E) is a small village located 18 km southwest of Vandavasi taluk and 23 km northeast of Gingee of Tiruvannamalai district in Tamil Nadu, India (Fig. 3.1). The Iron Age site of megalithic graves (Lat. 12°23'18.6" N; Long. 79°29'45.9" E) is located 3.27 km southwest of the present Kilnamandi village. There are more than 50 graves covering 55 acres of barren land (Fig. 3.2). This site was brought to the attention of the Tamil Nadu State Department of Archaeology through a proposal submitted by S. Balamurugan, Secretary of the Thiruvannamalai Centre for Historical Research (TCHR). Based on this proposal, a systematic exploration was carried out at this site by the State Department of Archaeology. As a result, the excavation was initiated in 2023 and continued for two seasons, 2022-2023 and 2023-2024. Historical significance.

Fig. 3.1 Kilnamandi: Aerial view of the site

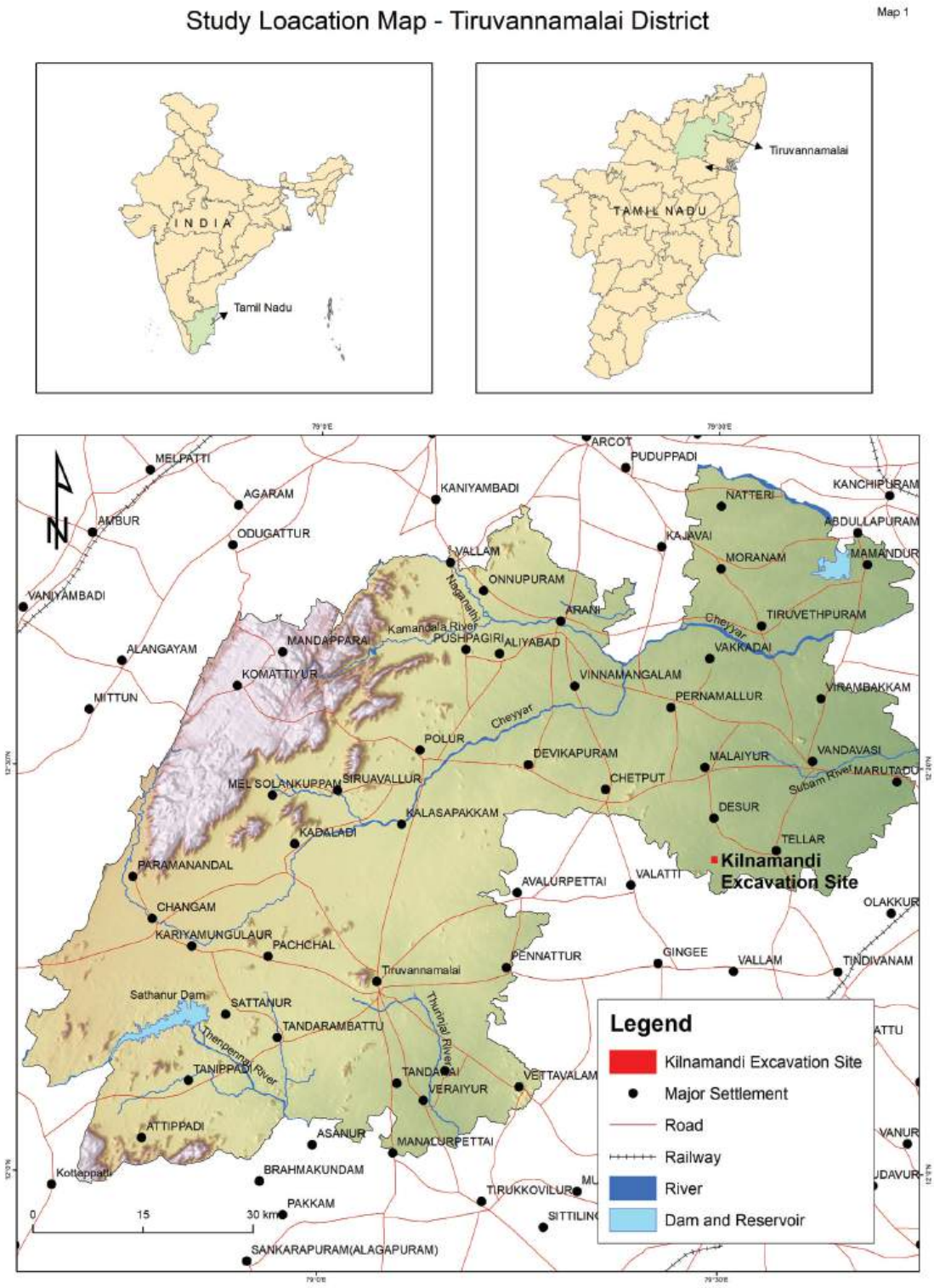


Fig. 3.2 Kilnamandi: Location Map

Historical significance

The Iron Age in South India witnessed significant social and cultural transformations, marked by the emergence of new technologies, the development of complex social hierarchies and the rise of distinct regional cultures. Even though the Iron Age in the southern part of Peninsular India is widely termed as 'Megalithic culture,' the aptness of using this term has been questioned by several scholars (Chattopadhyaya, 2008; Haricharan et al., 2013; Selvakumar and Darsana, 2008). In this monograph, in consensus with other scholars, 'Iron Age' refers to the cultural period and 'Megalithic' to the burial structures. The recent radiometric dates obtained from the excavations at Sivagalai in the Thoothukudi district, pushed back the introduction of iron in Tamil Nadu to the first quarter of the 4th millennium BCE (Rajan et al., 2025). The six scientific dates fall between 2427 BCE and 3345 BCE, with a mean value of 2815 BCE, confirming the introduction of iron in South India to the last quarter of the 3rd millennium BCE. The long survival of the sepulchral monuments naturally underwent notable changes, reflecting shifts in societal values, beliefs and technological capabilities. These burials are a valuable window into the past, offering glimpses of how communities treated their deceased members and expressed their beliefs about life, death and the afterlife.

Excavations

Archaeological investigations at Kilnamandi have identified seven distinct localities with potential for significant archaeological deposits. Locality-1 and Locality-2 have been excavated in the first season (2022-23) and in the second season (2023-24), Locality-1 (burial), Locality-3 (habitation), Locality-4 (habitation), Locality-5 (iron smelting area) and Locality6 (quarry site) were excavated. Locality-7 (quarry site) was explored and identified during this season.

Locality 1 (Burial ground)

This locality has more than 50 Iron Age megalithic burials spread over an area of 55 acres of barren land, in which 18 burials have been selected for excavation in the typological aspect and the quadrant method was followed for excavation. These burials are named in a sequential manner of Meg. 1 to Meg. 18 (Table 1). These burials can be broadly categorized into two types: cist burial with sarcophagus and pit burial with sarcophagus, which can then be further subdivided into burials with and without cairn circle and capstone. Out of 18 excavated megalithic burials, 15 of which are classified as type-1 and the other three as type-2.

Table 1: Sarcophagus exposed in different graves

S. No	Grave Number	Burial Type	Number of Sarcophagus	Orientation
1.	Meg.-1	Type-1	3	The orientation of sarcophagus B and C is east-west, while that of sarcophagus A is north-south (Fig. 3.3)
2.	Meg.-2	Type-1	3	The orientation of sarcophagus B and C is east-west, while that of sarcophagus A is north-south (Fig. 3.4)
3.	Meg.-3	Type-2	1	The orientation of the sarcophagus is northwest-southeast (Fig. 3.5)
4.	Meg.-4	Type-1	1	The orientation of the sarcophagus is northwest-southeast (Fig. 3.6)
5.	Meg.-5	Type-2	1	The orientation of the sarcophagus is northwest-southeast (Fig. 3.7)
6.	Meg.-6	Type-1	3	The orientation of sarcophagus B and C is east-west, while that of sarcophagus A is north-south (Fig. 3.8)
7.	Meg.-7	Type-1	0	(Fig. 3.9)
8.	Meg.-8	Type-1	2	Both sarcophagus A and B have a north-west-southeast orientation (Fig. 3.10)
9.	Meg.-9	Type-1	1	The orientation of the sarcophagus is northwest-southeast (Fig. 311)
10.	Meg.-10	Type-1	2	Both sarcophagus A and B have an east-west orientation (Fig. 3.12)
11.	Meg.-11	Type-1	2	Both sarcophagus A and B have an east-west orientation (Fig. 3.13)
12.	Meg.-12	Type-1	2	Both sarcophagus A and B have an east-west orientation (Fig. 3.14)
13.	Meg.-13	Type-1	0	(Fig. 3.15)
14.	Meg.-14	Type-1	3	The orientation of sarcophagus B and C is east-west, while that of sarcophagus A is north-south (Fig. 3.16)
15.	Meg.-15	Type-2	0	(Fig. 3.17)

S. No	Grave Number	Burial Type	Number of Sarcophagus	Orientation
16.	Meg.-16	Type-1	2	Both sarcophagus A and B have a northwest-southeast orientation (Figs. 3.18-3.20)
17.	Meg.-17	Type-1	1	The orientation of the sarcophagus is northwest-southeast (Figs. 3.21-3.22)
18.	Meg.-18	Type-1	0	(Fig. 3.23)
Total			**27**	

Type-1: Cist burial with sarcophagus

Most of these burials have a cairn heap on top made of granite and dolerite chips or pebbles and most of them are encircled by a circle of granite or dolerite boulders. However, some of them lack a circle. The cist is often built with four dressed charnokite stone orthostats aligned to create a Swastika in the plan. In some burials, there was an extra chamber on the east side of the cist. Some burials had capstones, while others do not.

Type-2: Pit burial with sarcophagus

This form of burial features a roughly rectangular pit that serves as the resting place for the sarcophagus and it is topped by a capstone made of undressed granite. Some of these graves have an enclosing cairn circle, while others do not.

Nature of Sarcophagus

There was a total of 27 sarcophagus found in the 18 excavated burials, only eight of which are still intact; the others have collapsed under the weight of the thick earthen heap that was placed on top of them. A burial can contain anywhere between one and three sarcophagus. Most of the Type-1 burials included one to three sarcophagus, while Type-2 burials contained only one (Fig. 3.24).

The sarcophagus found here varies from small to large. These sarcophagus are of red ware, handmade and mostly have an oblong tub shape with legs that range in number from 6 to 12. The number of legs varied depending on the size of the sarcophagus. Most sarcophagus have a chain-like design made of finger impressions that run horizontally below the rim and vertically in each of the four corners. In some cases, the design included inverted hooks that were likely meant to hold the lid, but which were missing. Pre-firing holes were found at the base of the sarcophagus. The inner portions of the sarcophagus were filled with loose earth, which caused the object inside to crumble. Pots, iron implements, beads

and pieces of human bone were among the offerings placed within and outside the sarcophagus.

Fig. 3.3 Kilnamandi: Aerial view of Meg.-1

Fig. 3.4 Kilnamandi: Aerial view of Meg.-2

Fig. 3.5 Kilnamandi: Aerial view of Meg.-3

Fig. 3.6 Kilnamandi: Aerial view of Meg.-4

Fig. 3.7 Kilnamandi: Aerial view of Meg.-5

Fig. 3.8 Kilnamandi: Aerial view of Meg.-6

Fig. 3.9 Kilnamandi: Aerial view of Meg.-7

Fig. 3.10 Kilnamandi: Aerial view of Meg.-8

Fig. 3.11 Kilnamandi: Aerial view of Meg.-9

Fig. 3.12 Kilnamandi: Aerial view of Meg.-10

Fig. 3.13 Kilnamandi: Aerial view of Meg.-11

Fig. 3.14 Kilnamandi: Aerial view of Meg.-12

Fig. 3.15 Kilnamandi: Aerial view of Meg.-13

Fig. 3.16 Kilnamandi: Aerial view of Meg.-14

Fig. 3.17 Kilnamandi: Aerial view of Meg.-15

Fig. 3.18 Kilnamandi: Aerial view of Meg.-16

Fig. 3.19 Kilnamandi: Side view of Meg.-16

Fig. 3.20 Kilnamandi: Sarcophagus-A from Meg.-16

Fig. 3.21 Kilnamandi: Aerial view of Meg.-17

Fig. 3.22 Kilnamandi: Sarcophagus from Meg.-17

Fig. 3.23 Kilnamandi: Aerial view of Meg.-18

Fig. 3.24 Kilnamandi: Top left Meg.-8, Top right Meg.-10, Bottom left Meg.-6, and Bottom right Meg.-3

Locality 2 (Mortuary camp)

This camp is located 300m southwest of the graveyard where 10 trenches were excavated. These trenches were positioned close to a small hilltop; four of them were placed on the northwest side of the hill and six others were placed on the southeast side. Although deposits from the later period were found in the trenches on the northwest side, the remaining six trenches on the southeastern side provided an interesting picture (Fig. 3.25).

Except for humus and natural soil, these trenches only have two layers (Fig. 3.26). The second layer contains Iron Age cultural artifacts like black-and-red ware pottery and graffiti bearing potsherds, while the first layer has much later deposits. This layer consists of several pits in the natural soil where broken black-and-red ware pottery and animal remains were collected. A small number of post holes in this layer indicate temporary structural activity (Fig. 3.27). In the case of antiquity, only two beads made of bone and ivory were found in these trenches.

Fig. 3.25 Kilnamandi: Overview of Locality-2

Fig. 3.26 Kilnamandi: Section showing pit activity from Locality-2

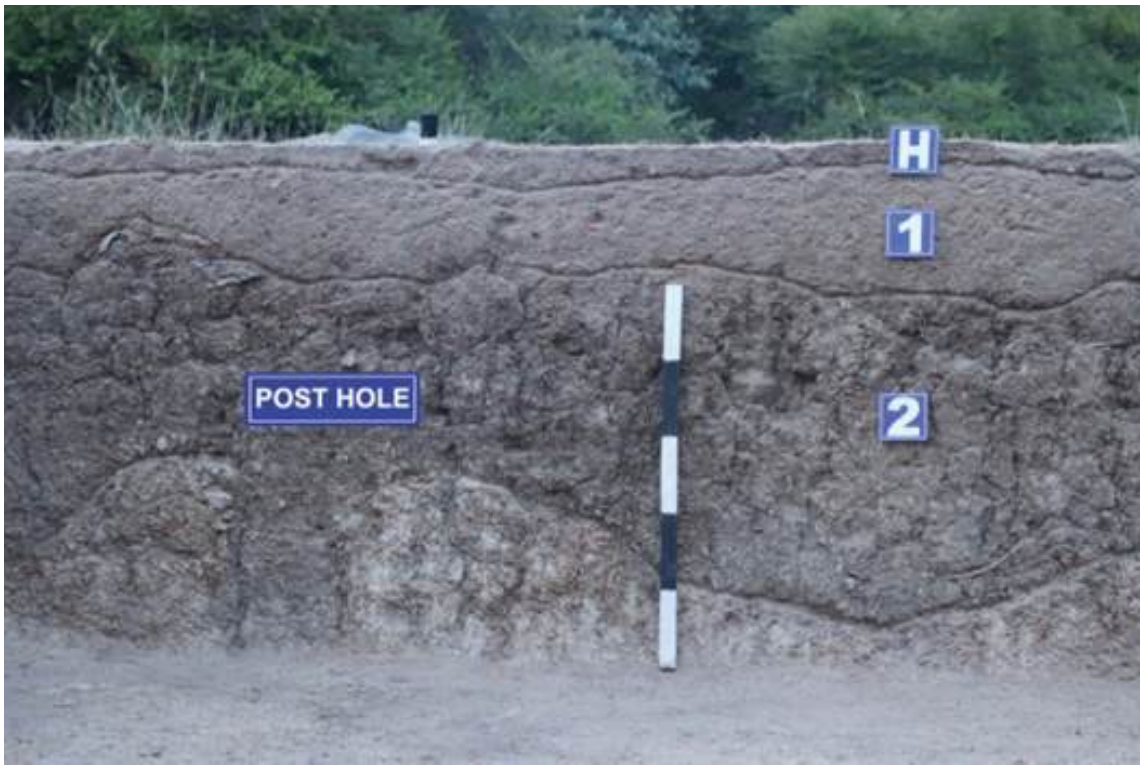


Fig. 3.27 Kilnamandi: Section showing post-hole

These findings indicate the building activity of a megalithic grave containing multiple sarcophagus, a cist constructed of slabs of charnokite and stone circles formed of enormous boulders takes a week or so, as is widely understood. Even in the modern era, burial grounds are typically situated far from habitation mounds, making it difficult for the authors of the burial to travel there every day to carry out the construction process. Therefore, it makes sense that they might have set up camp near the burial ground until they finished the burial construction and ritual.

The mere presence of post holes suggests that this location may have been a temporary camping area. Since everything they owned was either taken home or buried with the dead, they often do not leave any antiquities at the campsite, which explains why there are only two antiquities in these trenches. It is clear from the presence of animal bones in multiple pits discovered in the trenches that they disposed of their food scraps in a pit while camping. Furthermore, all the broken black-and-red pottery discovered here is the same as that which was buried and the graffiti marks discovered here are almost identical to those found in the graves. Given all the evidence, it appears that this location served as a campsite during the construction of megalithic graves. This unique campsite offers insights into camping in a proper archaeological context while megalithic burials are being constructed.

Dolerite Flakes

The burial Meg. 11 was excavated last year and the cairn heap yielded more than 1000 dolerite flakes. To understand its context, three 1x1m trenches were laid, named Meg. 11/1, Meg. 11/2 and Meg. 11/3 towards the northern side of the burial to understand whether the dolerite flakes were brought from somewhere and dumped here or were originally present here (Figs. 3.28-3.30). Based on the evidence yielded from these trenches, we could understand that the dolerite flakes have been brought from somewhere else and dumped here on the cairn heap.

Fig. 3.28 Kilnamandi: Overall view of Meg.-11/I, Meg.-11/II, and Meg.-11/III and Meg.-11

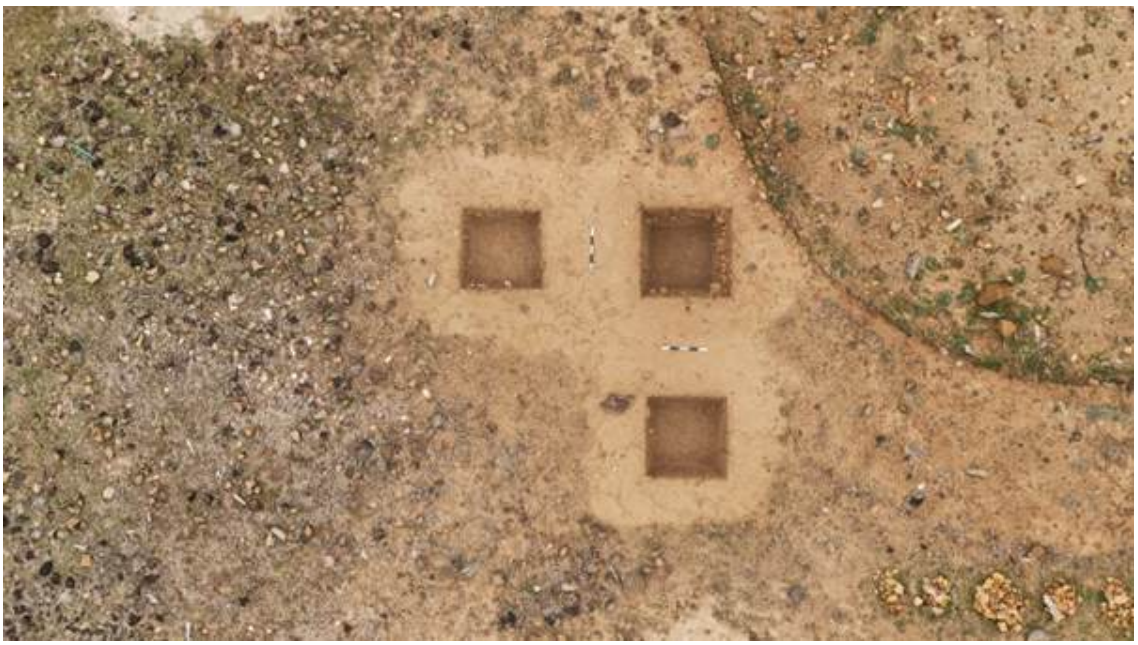


Fig. 3.29 Kilnamandi: Overall view of Meg.-11/I, Meg.-11/II, and Meg.-11/III

Fig. 3.30 Kilnamandi: Western side section from Meg.-11/I

Locality-3 (Habitation)

Locality 3 is in Nerkunam village, where two trenches were laid. The dimensions of the trench are 5 x 5m, with 50cm of baulk on either side, leaving a 4 x 4-meter area for excavation (Figs. 3.31-3.32). The two trenches are named A1 and B1, respectively, which consist of 2 layers, along with humus and natural soil. The first layer in these trenches yielded a good number of red ware potteries, which are medium cores and most of them were pot pieces. And the second layer yielded coarse variety of red ware and a few pieces of red slipped ware. In this layer, features such as pits and post holes have been identified, which suggests this might be the working level. Apart from these features, ten antiquities such as TC wheels, gamesmen, TC figurine, soap stone bracelet and hopscotches, were collected. Based on the materials found here, probably this locality must have been inhabited during the historical period and later.

Fig. 3.31 Kilnamandi: Overall view of Locality-3 Trench

Fig. 3.32 Kilnamandi: South Section from B-1

Locality-4 (Habitation)

Locality 4 is in Achamangalam village, where three trenches were laid. The dimensions of the trench are 5 x 5m, with 50cm of baulk on either side, leaving a 4 x 4-meter area for excavation (Figs. 3.33-3.35). The three trenches are named A1, ZB1 and YA1, respectively, which consist of 3 layers, along with humus and natural soil. The first layer consists of much later period potteries such as red ware, red slipped ware and brown slipped ware and the maximum thickness of this layer was 20cm. The second layer has an interesting feature, which is a structural activity made of stone slabs and rubble, but there was no clear pattern to identify what the structure was. The remains found in this trench was the basement of the original structure. This layer was dominated by red slipped ware followed by red ware and brown slipped ware. The third layer contained similar potteries but it also has features like pits where these potteries were dumped. A total number of 50 antiquities were found here such as shell bangles, glass bangles, TC beads, ear lobes, hopscotches, spindle whorls and saddle quern. This locality also seems to be an early historical habitation which continued to be habituated even later.

Fig. 3.33 Kilnamandi: Aerial view of Trench A-1 from Locality-4

Fig. 3.34 Kilnamandi: Aerial view of Trench ZB-1 from Locality-4

Fig. 3.35 Kilnamandi: Aerial view of Trench YA-1 from Locality-4

Locality-5 (Iron smelting area)

Locality 5 is an iron smelting site located in Magamayi Thirumani village. The site features a trench layout measuring 5 x 5m, with a 50cm baulk on each side. There are four trenches, each with a working area of 4 x 4m (Figs. 3.36-3.38). Each trench consists of three layers, including the humus and natural soil. The trenches are labelled A1, ZA1, ZB1 and XA1. In this site, the humus contains numerous iron slags. The first layer is made up of broken tuyeres and pieces from the furnace, both associated with the iron slags. Notably, in the ZB1 trench,

broken tuyeres extend to the second layer, where pure iron slags were also found. The second layer of all four trenches contains an area where pottery dumps and broken terracotta furnace pieces are present. It also has associated iron slags, particularly on the northern side. In this layer, we discovered sherds of black-and-red ware pottery related to the burning activity. Additionally, the A1 trench contains a circular clay pit measuring 10cm in diameter and 30cm deep, located in the southwest direction within the second layer. Overall, the iron smelting site has over ten broken tuyeres. This seems to be contemporary to the burial and probably the iron implements found in the grave were smelted in this area.

Fig. 3.36 Kilnamandi: Overall view of Locality-5

Fig. 3.37 Kilnamandi: Overall view of Locality-5

Fig. 3.38 Kilnamandi: Aerial view of Locality-5

Locality-6 (Quarry site)

This locality is in Vedal village on a lake and this area is a dolerite quarry site, which was used for dolerite axe making during the Neolithic or early Iron Age period. This has a huge mound measuring 77m in diameter and it is elevated 1.9m above the surface level. Initially, a trial trench was laid with a 1x1m dimension, which yielded good number of dolerite flakes representing dolerite axe making (Figs. 3.39-3.43). This led to further extension of the trenches in different parts of the mound, such as the top of the mound, the slope of the mound and its bottom. A total of 4 trenches were laid, of 1x1m. trenches are named as Z25, Y39, Y51 and X72. These trenches yielded more than 4000 dolerite flakes, which are the byproducts of dolerite axe manufacturing. The raw material source was discovered in this area, which made the Neolithic or Iron Age people quarry the raw material, prepare blanks and take them to their habitat for further processing. In and around the way from this locality to burial ground there are several pockets of polishing grooves which indicates the final processing of the dolerite axes. Documentation of such a huge assemblage of material is quite time consuming and once it is done, we could understand the technological aspects of axe manufacturing here.

Fig. 3.39 Kilnamandi: Overall view of Locality-6

Fig. 3.40 Kilnamandi: Aerial view of Trench Z-25 from Locality-6

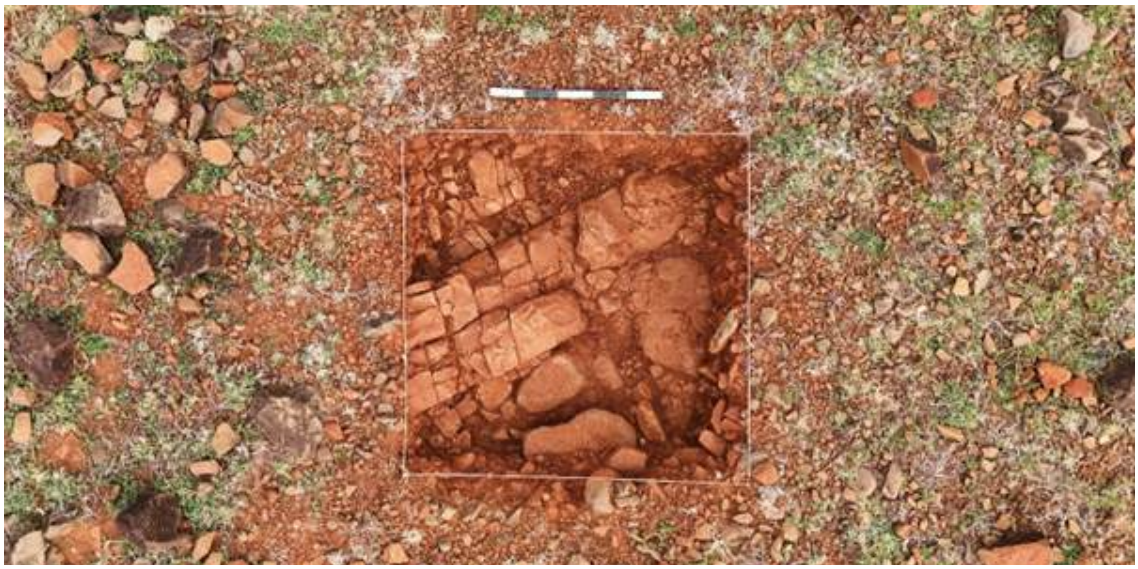


Fig. 3.41 Kilnamandi: Aerial view of Trench X-39 from Locality-6

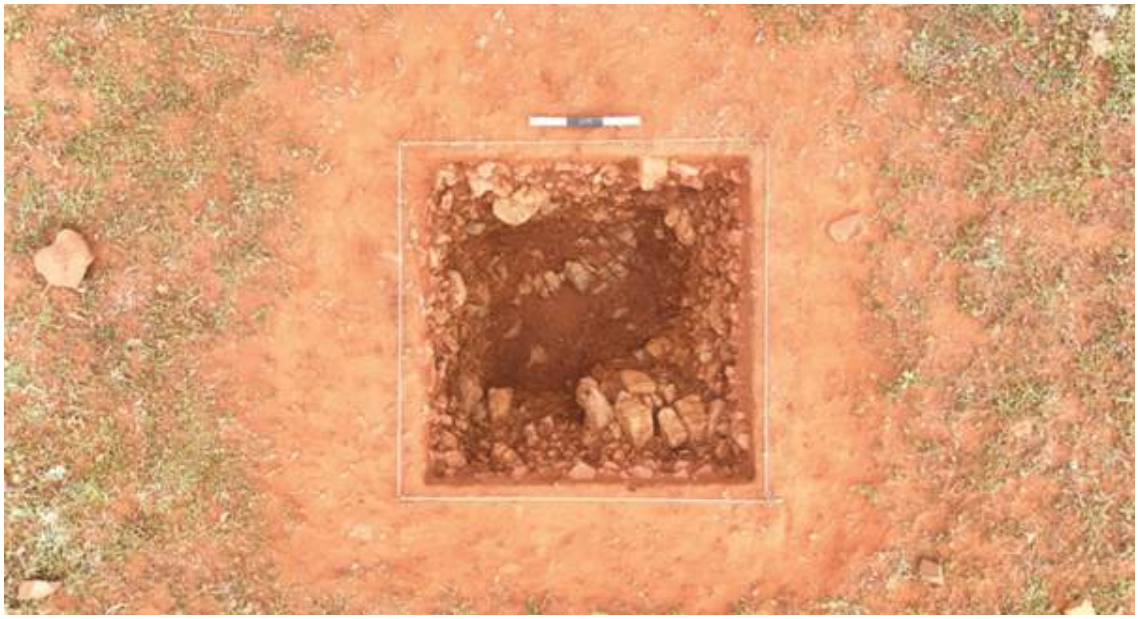


Fig. 3.42 Kilnamandi: Aerial view of Trench Y-51 from Locality-6

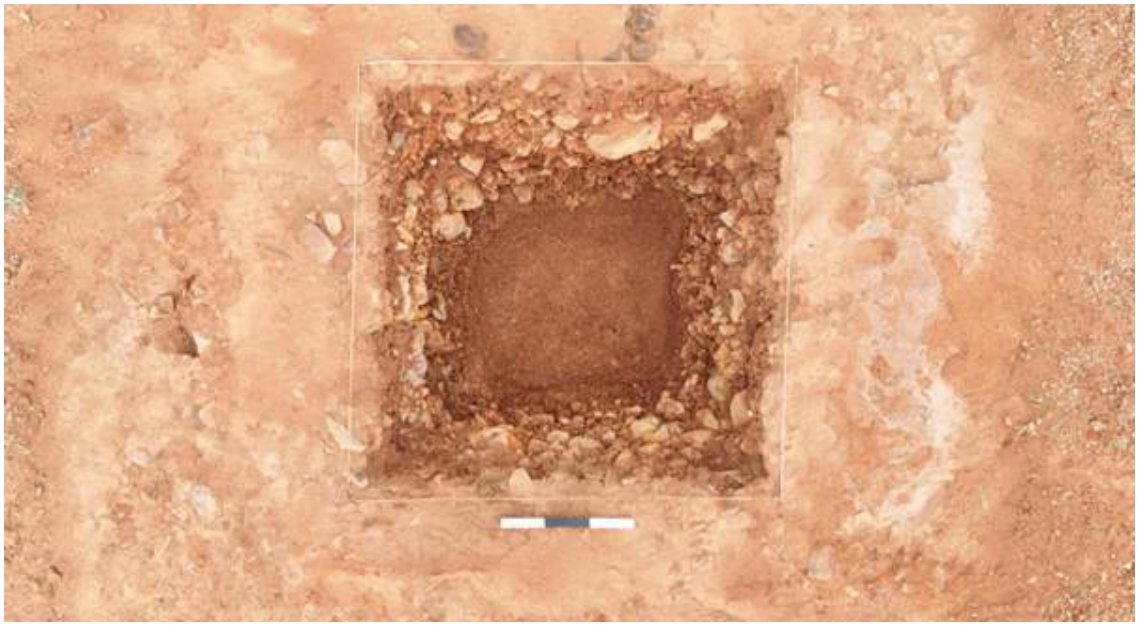


Fig. 3.43 Kilnamandi: Aerial view of Trench X-73 from Locality-6

Locality-7 (Quarry site)

This is also located in Vedal village, 1.7km south of locality 6. This locality was found by the excavation team while exploring the surroundings of the site. This is also a dolerite quarry site for axe manufacturing. This locality is present between two granite hills and we have an abundance of dolerite raw material source here (Figs. 3.44). A good number of broken axe blanks and one complete polished axe were collected (Figs. 3.45-3.47). Foothill has a good number of BRW potteries, which suggests this might have an Iron Age habitation here. A trial trench is planned to be laid here soon in order to determine the cultural materials present here.

Fig. 3.44 Kilnamandi: Aerial view of Vedal Mountain from Locality-7

Fig. 3.45 Kilnamandi: Rough out from Locality-7

Fig. 3.46 Kilnamandi: Small rough out from Locality-7

Fig. 3.47 Kilnamandi: Polished Axe from Locality-7

Scientific investigations/Documentation

Scientific documentation, such as lidar mapping of the site, is done during the first season of excavation. The plan and section drawings of each trench are made by a draftsman and they are digitally converted into CAD drawings. The quantitative analysis of potteries from different habitation sites is done to understand the cultural material transmission and they are also drawn and digitally converted into CAD drawings. The antiquities found from these localities are recorded in the antiquity register and the NMMA documentation has been done. These antiquities are properly photographed and documented. OSL samples were taken for each layer in the habitation and charcoal samples were collected without contaminating their nature. The flakes found from locality 6 are documented in an Excel sheet to do qualitative and quantitative analysis soon.

Summary of the findings

The excavation yielded a good number of associated grave goods, which are mainly of potteries of different varieties, graffiti marks, antiquities and fragmentary human skeletal remains.

Potteries

The pottery collection from this site includes typical Iron Age black-and-red ware, black slipped ware, red ware and red slipped ware. These potteries were collected from both inside and outside the sarcophagus. The major types of black-and-red ware found here are bowls, dishes, pots and miniature vessels. The black slipped ware consists of only a ring stand and a lid knob. The red ware and red

slipped ware are confined mainly to large and mediumsized vessels, represented by ring stands, three-legged jars and globular pots.

Graffiti

A total number of 19 post-firing graffiti-bearing potsherds engraved on the shoulder portion of the pots were found here which are predominantly on black-and-red ware and red slipped ware (Fig. 3.48). The common graffiti marks found here are a fork-like sign (two oblique lines meeting a central vertical line at the top, which somewhat looks like a threepronged fork) this symbol mostly occur in pair. Another one is two semi-concentric circles arranged in a U form. A notable graffiti was found in the graves of Meg. 2 and 6 and it consists of two vertical lines with a wavy line superimposed on them.

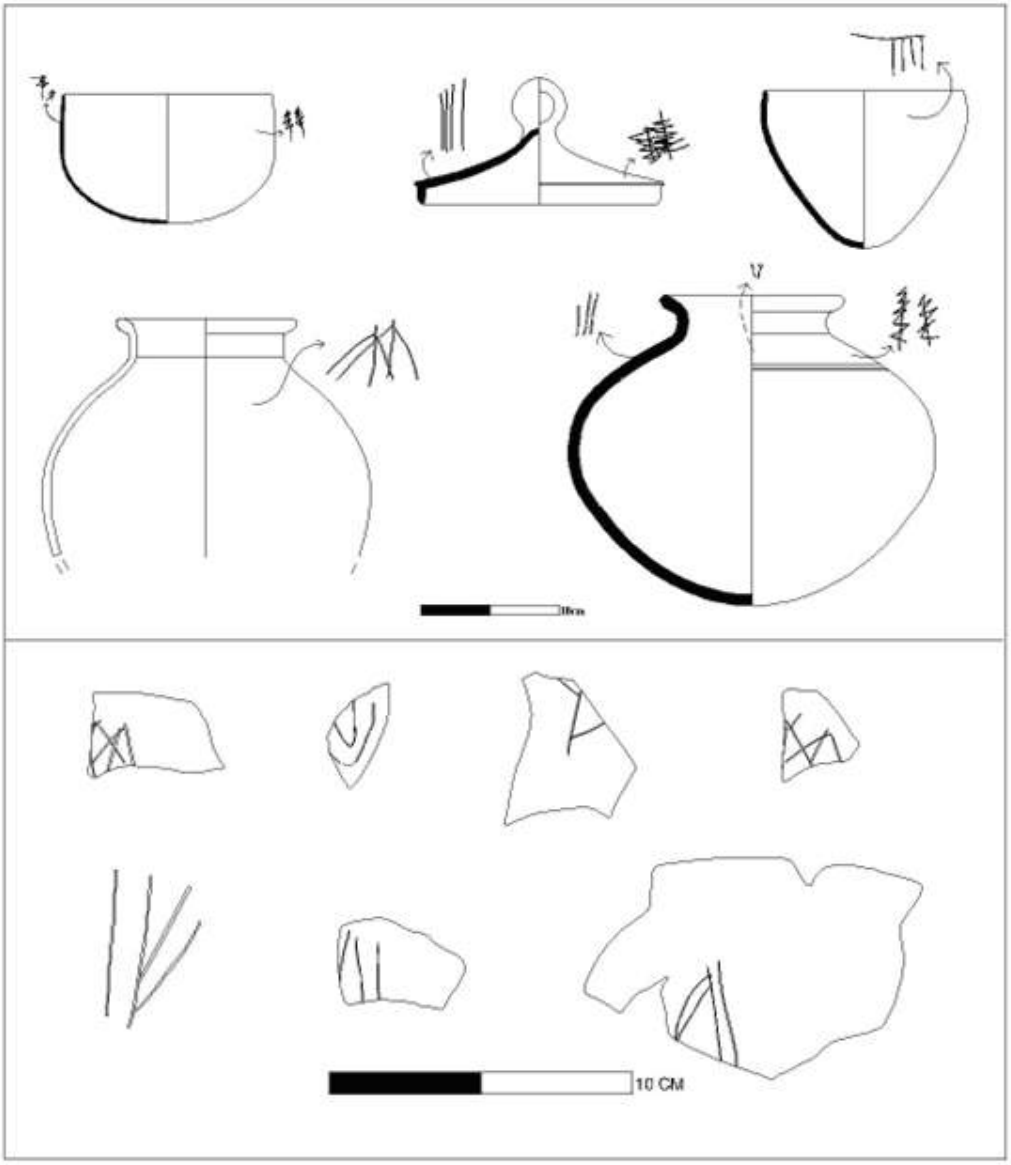


Fig. 3.48 Kilnamandi: Graffiti bearing potsherds - Auto CAD Drawing, from Locality-1

Antiquities

Locality 1 provided stone objects and iron objects. Locality 3 and 4 provided stone objects, terracotta objects including hopscotches, TC beads, ear lobes, spindle whorls, TC wheels, gamesmen and TC figurine, along with iron object, shell bangles, glass bangles and soap stone bracelet (Figs. 3.49-3.56). Locality 5 yielded a good number of tuyeres and iron slags, throwing light on iron smelting activity. Locality 6 and 7 provided a good number of dolerite axe blanks and flakes.

One of the notable finds is an unidentified stone object which is hemispherical in shape and initially looked like a bowl but had a hole at the centre. As a decoration, on the outside there are 11 grooved lines, which starts from the hole and ends at the edge of the object, where two parallel grooved lines run around the edge and in between the multiple slanting grooved lines. The object is of chlorite schist stone, which is greenish-grey in colour and it might be a lid.

Antiquities in and around the sarcophagus

Antiquities are found both inside and outside the sarcophagus, which can be classified as beads, iron objects and stone objects which are a totally 21 in number (Table 2).

Table 2: Antiquities found in the excavation

S.No	Trench	Object	Material	Inside/ Outside Sarcophagus	Remarks
1	Meg. 2	Bead	Etched Carnelian	Outside	Barrel-shaped, has etched designs
2	Meg. 2	Bead	Etched Carnelian	Outside	Barrel-shaped, has etched designs
3	Meg. 2	Bead	Etched Carnelian	Outside	Barrel-shaped, has etched designs
4	Meg. 2	Bead	Etched Carnelian	Outside	Elongated barrel-shaped, has etched designs
5	Meg. 2	Bead	Etched Carnelian	Inside	Elongated barrel-shaped, has etched designs
6	Meg. 8	Bead	Serpentine	Inside	Long square barrel-shaped
7	Meg. 8	Bead	Serpentine	Inside	Long square barrel-shaped
8	Meg. 8	Bead	Serpentine	Inside	Long square barrelshaped

S.No	Trench	Object	Material	Inside/ Outside Sarcophagus	Remarks
9	Meg. 8	Bead	Glass	Inside	Short square barrel-shaped, red in color
10	Meg. 8	Bead	TC	Outside	Whorl-bead, black in color
11	Meg. 2	Nutcracker	Stone	Outside	Broken
12	Meg. 1	Chisel	Iron	Outside	Broken
13	Meg. 2	Unidentified	Iron	Outside	Half broken
14	Meg. 3	Axe	Iron	Outside	Fragile condition
15	Meg. 3	Axe	Iron	Inside	Good condition
16	Meg. 6	Chisel	Iron	Inside	Good condition
17	Meg. 6	Axe	Iron	Inside	Good condition
18	Meg. 6	Axe	Iron	Inside	Fragile condition
19	Meg. 8	Chisel	Iron	Inside	Good condition
20	Meg. 8	Unidentified	Iron	Inside	Broken
21	Meg. 8	Unidentified	Iron	Inside	Broken

Fig. 3.49 Kilnamandi: Antiquities from Locality-1

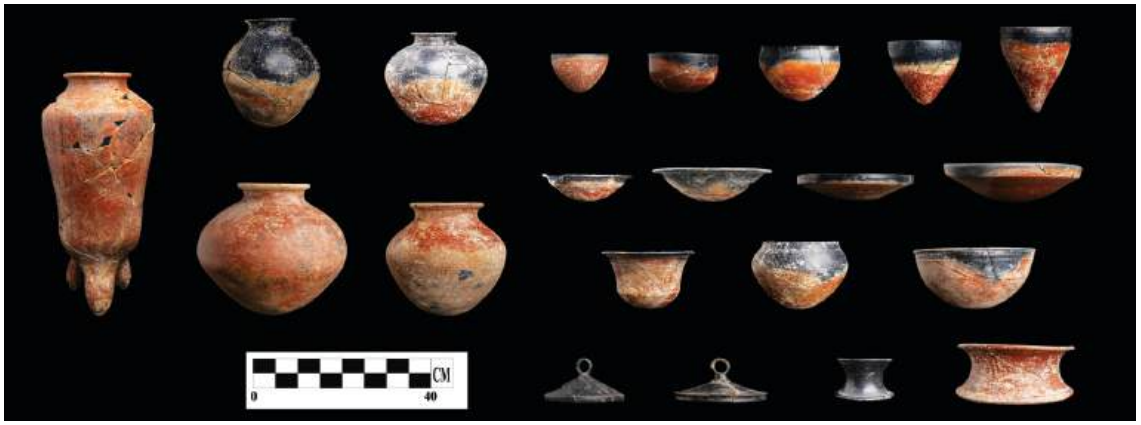


Fig.3.50 Kilnamandi: Legged jar, Pot, Bowl, Dish, Ring stand, and lid are from Locality-1.

Fig. 3.51 Kilnamandi: Pot, Bowl, Ring stand, and lid are from Locality-1

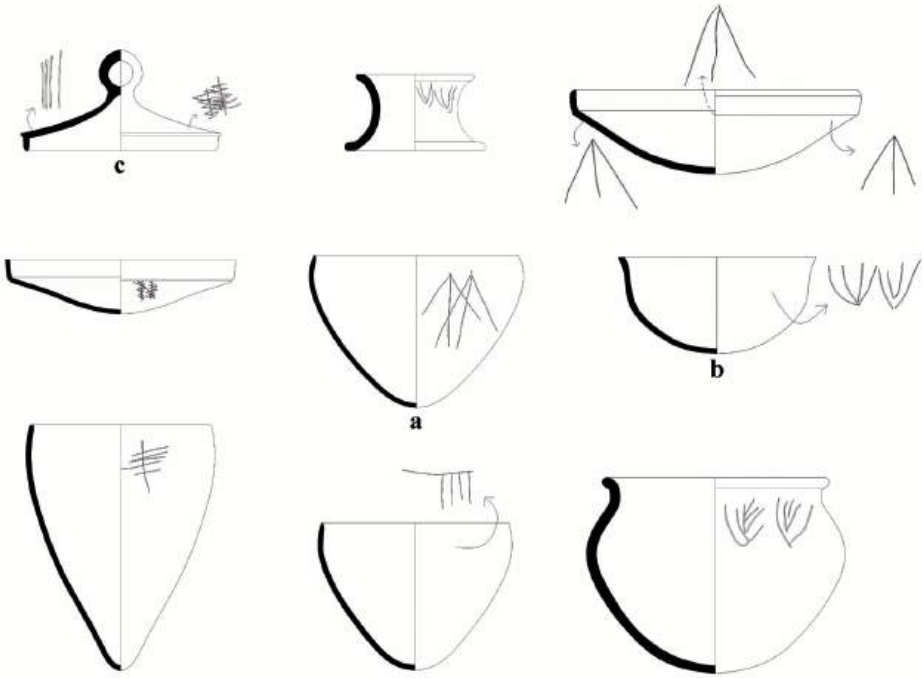


Fig. 3.52 Kilnamandi: Graffiti bearing potsherds - Auto CAD Drawing from Locality-1

Fig. 3.53 Kilnamandi: Iron antiquities are from Locality-1

Fig. 3.54 Kilnamandi: Beads and Stone antiquities are from Locality-1

Fig. 3.55 Kilnamandi: Antiquity from Locality-1

Fig. 3.56 Kilnamandi: Antiquities are from Locality-3

Chronology

A part from Kilnamandi; Paiyampalli, Kunnathur, Sanur, Perumbair, Auroville, Siruthavur and Pallavaram in Tamil Nadu were some of the excavated sites where sarcophagus were reported (Gayathri et al., 2024). Only Pallavaram

and Siruthavur were scientifically dated. The chronology of the sarcophagus dates back to the 4th century BCE, according to the dates from the above two sites (Gayathri et al., 2024 & Badhreenath, 2011) (Table: 3). However, the recent AMS dates from the Kilnamandi excavation pushed the sarcophagus chronology as early as the 17th century BCE.

Table: 3 Radiometric dates from excavated sites				
S.No.	**Site**	**Sample No**	**Method**	**Age (years)**
1.	Siruthavur	MEG. 4	OSL	2340+/-51
2.	Siruthavur	MEG. 5c	OSL	2015+/-108
3.	Pallavaram	PVM-3	OSL	2270+/-220
4.	Pallavaram	PVM-4	OSL	2390+/-370
5.	Kilnamandi	KMD1/2023-001	AMS14C	3400+/-30

A charcoal sample collected from a stone circle entombing a pit burial with sarcophagus (Meg. 3), along with iron objects (Figs. 3.57-3.58), was sent to the Beta Analytic testing laboratory for AMS dating (Beta 666752). The conventional date of 1450 BCE (3400±30 BP) was obtained. The calibrated date falls between 1769 BCE and 1615 BCE (93.3%) and the mean value goes back to 1692 BCE. The most significant feature of the excavation is that an AMS date of 1692 BCE is obtained for the first time for a sarcophagus so far excavated in Tamil Nadu. Further, the grave goods contain graffiti-bearing pots, which indirectly place the date of the graffiti marks to the 17th century BCE.

Fig. 3.57 Kilnamandi: Meg.- 3 Ariel view on top, exposed sarcophagus on the bottom left & graffiti inscribed pots and iron objects on the bottom right

BetaCal 4.20

Calibration of Radiocarbon Age to Calendar Years

(High Probability Density Range Method (HPD): INTCAL20)

(Variables: d13C = -25.3 o/oo)

Laboratory number **Beta-666752**

Conventional radiocarbon age **3400 ± 30 BP**

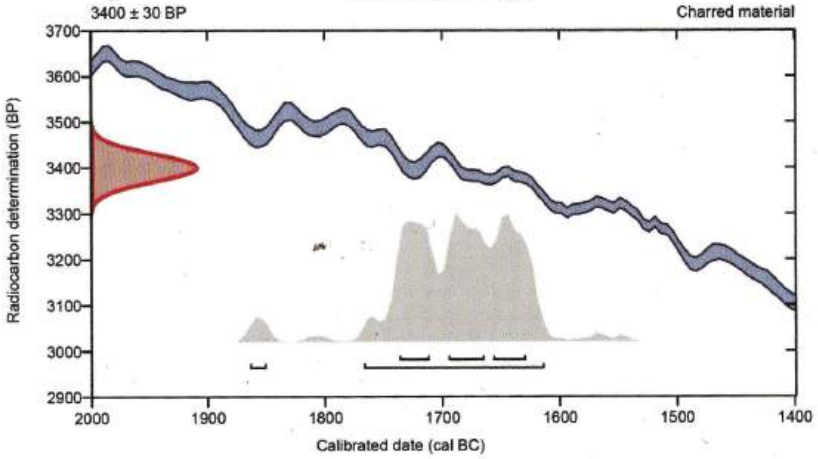
95.4% probability

(93.3%)	1769 - 1615 cal BC	(3718 - 3564 cal BP)
(2.1%)	1866 - 1852 cal BC	(3815 - 3801 cal BP)

68.2% probability

(25.2%)	1697 - 1666 cal BC	(3646 - 3615 cal BP)
(22.1%)	1659 - 1631 cal BC	(3608 - 3580 cal BP)
(21%)	1739 - 1713 cal BC	(3688 - 3662 cal BP)

KMD1/2023 - 001



Database used

INTCAL20

References

References to Probability Method

Bronk Ramsey, C. (2009). Bayesian analysis of radiocarbon dates. Radiocarbon, 51(1), 337-360.

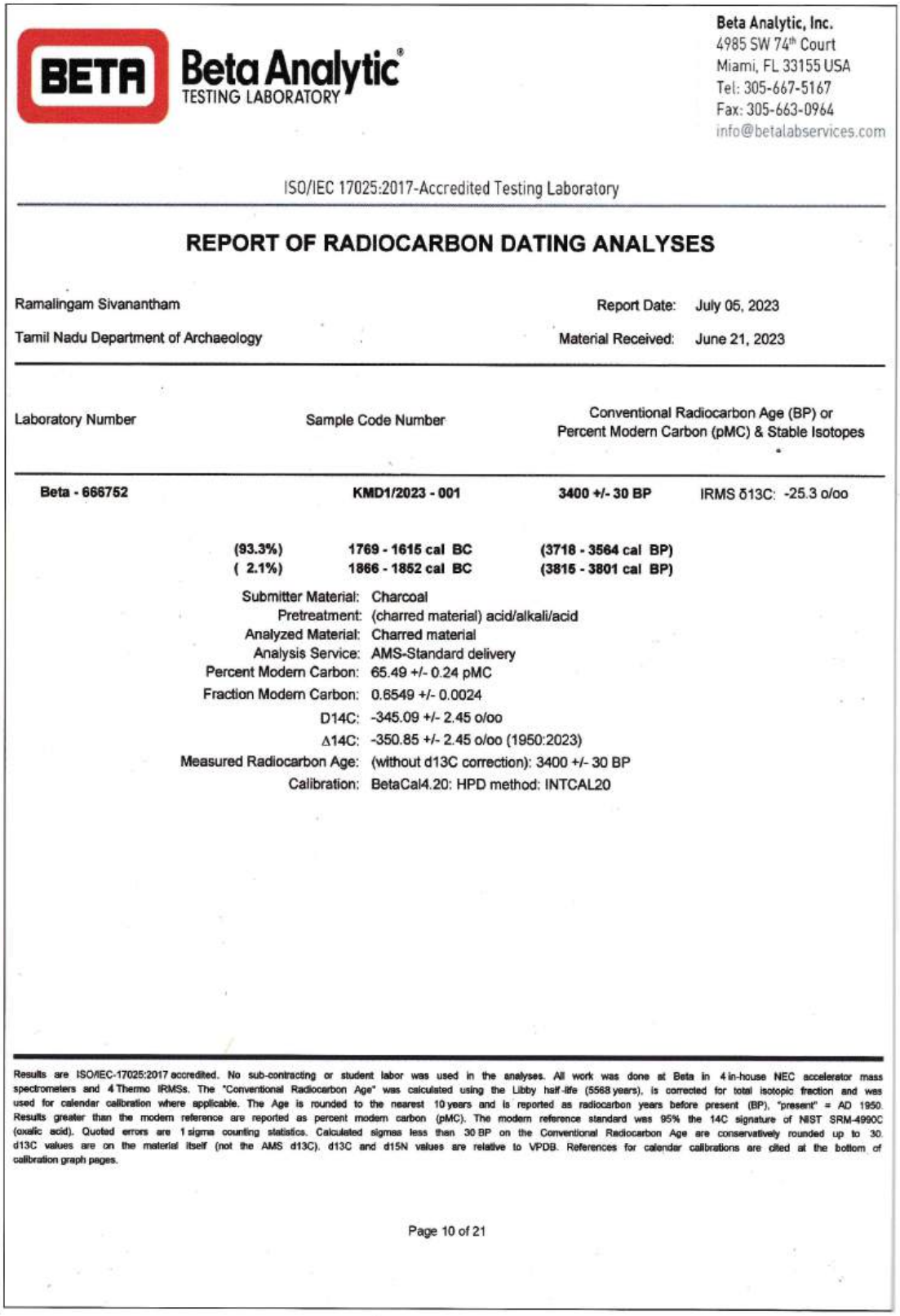
References to Database INTCAL20

Reimer, et al., 2020, Radiocarbon 62(4):725-757.

Beta Analytic Radiocarbon Dating Laboratory

4985 S.W. 74th Court, Miami, Florida 33155 • Tel: (305)667-5167 • Fax: (305)663-0964 • Email: beta@radiocarbon.com

Fig. 3.58a Kilnamandi: AMS date from Beta Analytic



Beta Analytic, Inc.
4985 SW 74th Court
Miami, FL 33155 USA
Tel: 305-667-5167
Fax: 305-663-0964
info@betalabservices.com

ISO/IEC 17025:2017-Accredited Testing Laboratory

REPORT OF RADIOCARBON DATING ANALYSES

Ramalingam Sivanantham — Report Date: July 05, 2023

Tamil Nadu Department of Archaeology — Material Received: June 21, 2023

Laboratory Number	Sample Code Number	Conventional Radiocarbon Age (BP) or Percent Modern Carbon (pMC) & Stable Isotopes	
Beta - 666752	**KMD1/2023 - 001**	**3400 +/- 30 BP**	IRMS δ13C: -25.3 o/oo
(93.3%)	**1769 - 1615 cal BC**	**(3718 - 3564 cal BP)**	
(2.1%)	**1866 - 1852 cal BC**	**(3815 - 3801 cal BP)**	

Submitter Material: Charcoal
Pretreatment: (charred material) acid/alkali/acid
Analyzed Material: Charred material
Analysis Service: AMS-Standard delivery
Percent Modern Carbon: 65.49 +/- 0.24 pMC
Fraction Modern Carbon: 0.6549 +/- 0.0024
D14C: -345.09 +/- 2.45 o/oo
Δ14C: -350.85 +/- 2.45 o/oo (1950:2023)
Measured Radiocarbon Age: (without d13C correction): 3400 +/- 30 BP
Calibration: BetaCal4.20: HPD method: INTCAL20

Results are ISO/IEC-17025:2017 accredited. No sub-contracting or student labor was used in the analyses. All work was done at Beta in 4 in-house NEC accelerator mass spectrometers and 4 Thermo IRMSs. The "Conventional Radiocarbon Age" was calculated using the Libby half-life (5568 years), is corrected for total isotopic fraction and was used for calendar calibration where applicable. The Age is rounded to the nearest 10 years and is reported as radiocarbon years before present (BP), "present" = AD 1950. Results greater than the modern reference are reported as percent modern carbon (pMC). The modern reference standard was 95% the 14C signature of NIST SRM-4990C (oxalic acid). Quoted errors are 1 sigma counting statistics. Calculated sigmas less than 30 BP on the Conventional Radiocarbon Age are conservatively rounded up to 30. d13C values are on the material itself (not the AMS d13C). d13C and d15N values are relative to VPDB. References for calendar calibrations are cited at the bottom of calibration graph pages.

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Fig. 3.58b Kilnamandi: AMS date from Beta Analytic

Conclusion

Excavation at Kilnamandi yielded a good number of archaeological remains reflecting major Iron Age settlement in this area. From the findings of the burials we could sketch an overall picture of the burial practices of the people settled here. Of the 18 excavated burials, including two major types, stone circles are made up of huge to small dolerite and granite boulders, the outcrop of which is locally available near the site, from where it is apparently quarried for the requirement. The cist slabs are made of dressed charnokite, which is of a low quality, because of which most of the cist slabs are worn down into pieces. The porthole on the cist, if there had been any, has entirely disappeared due to the low quality of the stone. Cutting or quarrying these stones into slabs from the source and placing them into the stone circle would have required quality iron equipment and apt techniques. Transporting of these slabs may have been done using wooden rollers as a community effort.

Some of the burials here contain only one sarcophagus, whereas others have two to three sarcophagus. In the burials having a single sarcophagus, secondary human skeletal remains and grave goods are kept together, whereas in burials having three sarcophagus, secondary human skeletal remains are kept in one sarcophagus and grave goods are kept in the other two sarcophagus. The grave goods are mainly of a fine variety of black-and-red ware, fine to a medium variety of red ware with or without slip, iron implements and ornamental beads. These sarcophagus and the grave goods represent the socio-economic status of the buried person. This is well reflected in two burials, namely Meg. 1 and Meg. 5. Meg. 1 has a huge stone circle with a cist chamber made of dressed charnokite and three sarcophagus placed inside it. Whereas Meg. 5 has a single sarcophagus covered by a capstone, no stone circle or cist was present here and no grave goods were also found. This shows the time and labour used for both burials. For erecting the Meg. 1 burial, at least 10 to 15 people must have worked together for days to complete it, whereas for Meg. 5, a few people within a day or two could easily finish the task. This reflects that the person for whom Meg. 1 is made had a much greater socio-economic status in society than that of the person for whom Meg. 5 is made. This also gives forth that doing this process would have required organized social labour of the community for which the deceased person's family could gather.

Some of the graffiti symbols found here are constrained to certain burials, such as two semi-concentric circles arranged in a U-form found only in Meg. 8 and two vertical lines with a superimposed wavy line are only found in Meg. 2 and Meg. 6. The occurrence of these graffiti marks in particular burials indicates that

these burials could have been of the same family or members of the same clan or community. Axes and chisels are the most common iron tools found here. These iron tools exhibit greater metallurgical expertise. Given the presence of locality 5 which is located approximately 3km west of burial ground, provides convincing evidences that this iron implements were produced locally. The presence of etched carnelian beads, a product of the Maharashtra and Gujarat region, collected from Meg. 2, indicates that the authors of this burial had trade contact with the northern part of the country. Out of 18 burials here, only 6 of them yielded human skeletal remains, which are all secondary because the process of erecting these burial monuments required an ample amount of time. However, there is no direct evidence of what they primarily did with the dead, but it is believed that they might have buried or exposed them somewhere and later collected the skeletal remains; not all the bones of the dead but all that could be found readily after the flesh had decomposed or had been eaten away by the carrion-eating birds or beasts (Banerjee, 1966). They then put them inside the sarcophagus along with suitable grave goods. The presence of a campsite within the archaeological context offers a unique opportunity to observe the logistical and practical aspects of burial construction.

Apart from this burial ground, the locality 2 mortuary campsite, which was excavated, gives a new understanding of megalithic burial construction. This unique campsite offers insights into camping in a proper archaeological context while megalithic burials are being constructed. The locality 3 and 4 are of habitations of early historical to later period. Locality 6 and 7, a dolerite quarry site, provides good evidence of stone axe manufacturing which might belong to either Neolithic or Early Iron Age but without scientific dates we cannot exactly place this site in a chronological order. Locality 6 was excavated which yielded more than 4000 flakes which are being documented and once it is complete we can talk about the technological aspects of it. The foot hills of locality 7 yielded good number of iron age potteries on exploration so a trial trench is planned to laid there in order to understand the cultural context present here.

The AMS date obtained from the burial ground pushes back the chronology of the sarcophagus as early as the 17th century BCE. However, to support this date, another sample is planned to be dated in the OSL method, which might give a better understanding of the chronology and support the previously obtained date. This excavation provides valuable insights into understanding the Iron Age settlement in this vicinity and their mortuary practices. Also, it might give us some insights into the stone axe manufacturing industry in this area, which needs further detailed archaeological investigation.

Acknowledgment

The successful completion of this article, detailing the significant findings of the Kilnamandi excavation, would not have been possible without the invaluable contributions and unwavering support of numerous individuals and institutions. We extend our deepest gratitude to all who played a part in bringing this research to fruition.

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Special thanks are due to Dr. R. Sivanantham, Joint Director (Technical), Tamil Nadu State Department of Archaeology and Prof. K. Rajan, Academic Adviser, State Department of Archaeology, for their visionary leadership, guidance and expertise, which were crucial to the success of the excavation.

We also acknowledge the tireless efforts of the entire excavation team, including J. John Juvan, N. Rajasekar, R. Vallarasu and S. Arthi (field supervisors), whose dedication and hard work in challenging conditions were exemplary.

We are particularly indebted to the local community of Kilnamandi village for their warm hospitality, cooperation and active participation. Their insights into the local landscape and history, as well as their willingness to assist the excavation team, were indispensable.

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Excavations at Marungur

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K. Bakialakshmi
S. Subalakshmi

Introduction

Marungur is a small village located about 2km west of Kollukkarankuttai on the Chennai - Kumbakonam highway in Panruti taluk of Cuddalore district. The habitation mound (Lat. 11°39'09" N; Long. 79°32'23" E) locally referred as Erikaraimedu lies east of the water tank at an elevation of 99m above MSL. Burial site (Lat. 11°39'22.95" N; Long. 79°32'34.25" E) lies northeast of the village at a distance of 1.5km from the habitational mound (Fig. 4.1).

Fig. 4.1 Marungur: Google Earth Satellite image of the habitational and burial site

The Cuddalore region did not receive much attention from archaeologists, only a limited area was explored and a few sites were excavated. The excavated sites such as Nallur *(Sengamedu)*, Maligaimedu, Karaikadu and Kudikadu, which date back to - Early Historic Period. The site Mukasaparur located 32km west of Marungur, is considered as the fossil site of Cuddalore region. K. Rajan and his team have discovered more than 60 Iron Age sites along with a number of Early Historical sites (Fig. 4.2) (Rajan et.al.2009).

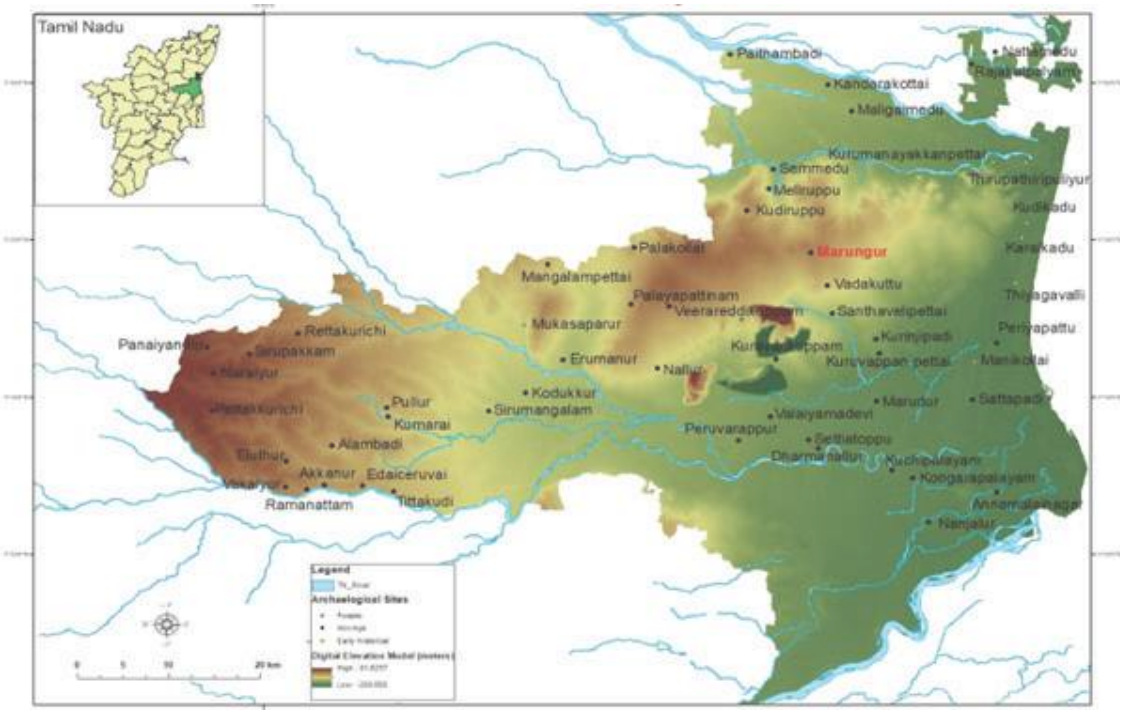

Fig. 4.2 Marungur: Map showing Archaeological sites in Cuddalore district site

Historical Background

Historically, the Cuddalore region was under the control of various kingdoms and rulers such as the Cholas, the Malayaman of Maladu, the Pallavas, the Pandyas, the Vijayanagaras, the Senji Nayaks, the Bahmani Sultanate and Europeans. The inscriptional evidences of various kings refer to various territorial divisions of this region as *Nadunaadu, Thirumunaipadinadu, Naduvilnadu, Rajendracholavalanadu, Rajarajavalanadu, Naduvilmandalam* and *Merkanadu.* Each territorial division is marked with rivers or water bodies as an indicator of the boundary. For instance, the territorial division Merkanadu covers the Gadilam river on the north, the Vellar river on the south, Tittakudi and Pennadam on the west and the Bay of Bengal on the east.

In the 17th century, the Cuddalore coast became a significant zone for trade activities by the Europeans. The Dutch established a temporary settlement in Cuddalore for several years. Subsequently, the British occupied this region, made a robust administrative presence and constructed a Fort of St. David, which served as their initial headquarters.

Explorations

The archaeological exploration conducted in 2009 by J. R. Sivaramakrishnan, encountered light grey rouletted ware, black-and-red ware, microlithic tools and a crescent-shaped iron chisel. He also noticed a brick structure with bricks measuring

7 × 21 × 42cm on the southern side of the cultural mound collected hopscotches and glass beads (green, purple, yellow, black and white), black-and-red ware, an iron furnace, terracotta pipes, urn, circular stands, a lid of black polished ware, a broken part of the lamp and unidentified iron objects were collected. The material evidences of the site suggest that it belongs to the Iron Age.

Four graffiti-inscribed potsherds and three Tamili (Tamil-Brahmi) inscribed potsherds were collected from the burial which read *a-ti-y(a)-ka-ṉ, a-ma-ṉ* and *a-ta*. These inscribed potsherds could be dated on paleographic grounds to 2- 3rd century BCE.

Fig. 4.3 Marungur: Tamili inscribed black-and-red ware potsherd with reading "a-ti-y(a)-ka-ṉ"

Aim of excavation

Based on the archaeological findings collected from the explorations, it was believed that the date of this site may fall between the Iron Age and the Early Historic Period. The purpose of this excavation was to scientifically identify the continuous cultural development that existed in this region.

Remote Sensing Survey by UAV (Unmanned Aerial Vehicle)

A geoarchaeological survey using a remote sensing Unmanned Aerial Vehicle (UAV) was carried out to assess the extent of the habitation mound for carrying out systematic archaeological excavations (Fig. 4.4).

Present excavations

The habitation mound located on the northern side of the road that connects Marungur village to Keelakollai and on the eastern side of the tank represents a

significant cultural mound that covers a vast area. The mound was divided into four zones corresponding to the cardinal directions. The entire site was organized into a grid layout, with each trench measuring 5m x 5m. Totally eight trenches namely A1, ZB1, ZG7, ZE3, ZF7, F1, A2 and ZO6 were laid and excavated. The burial site is located on northeast of the habitational mound. In total, two graves Meg.-I and Meg.-II were excavated (Fig. 4.5).

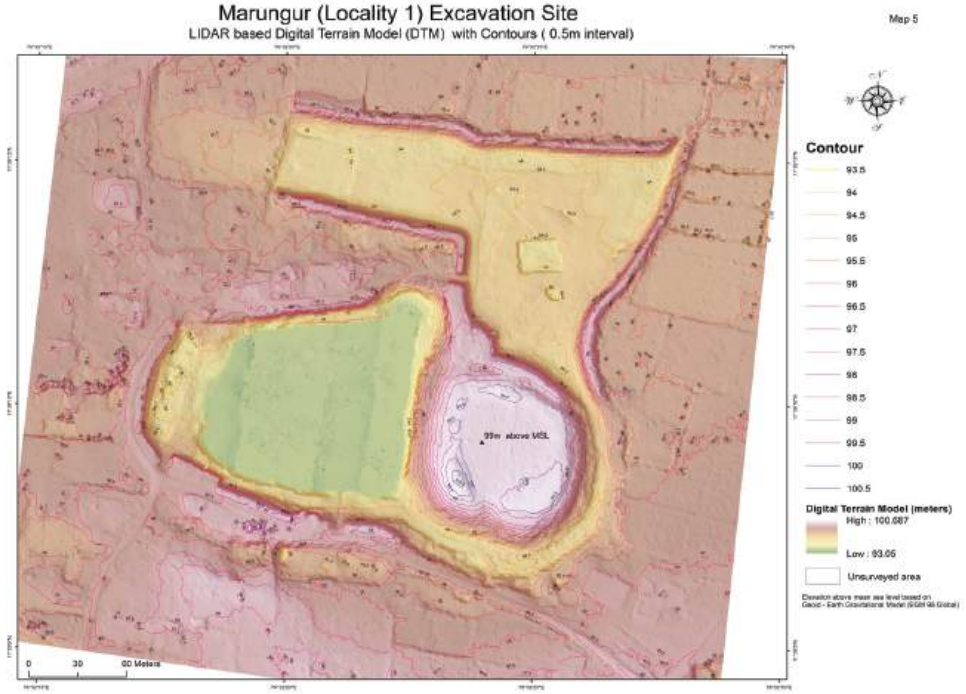

Fig. 4.4 Marungur: Lidar-based digital terrain model and contours along with MSL

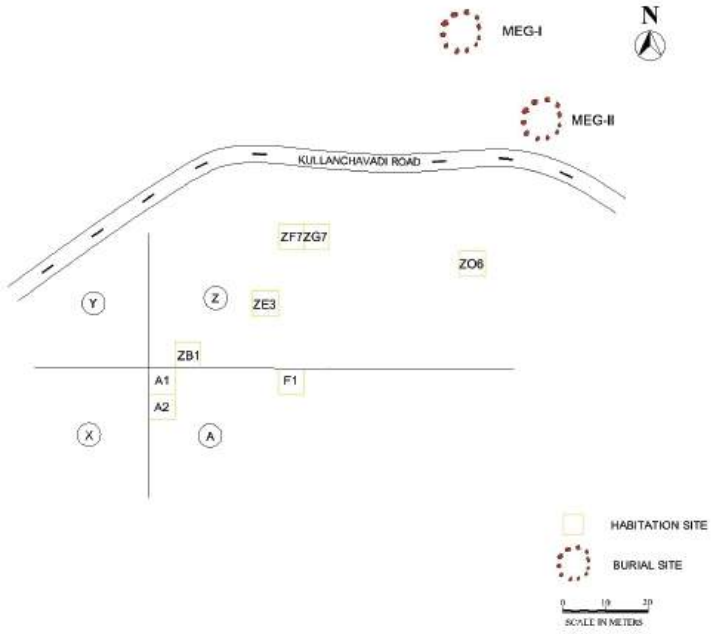

Fig. 4.5 Marungur: Layout of the excavated trenches and graves

Habitation Cuttings

The excavated trench met with eight distinct stratigraphical layers, both geological and archaeological, in which four layers yielded the cultural materials that can be divided into two periods based on the associated materials like ceramics, antiquities, graffiti inscribed sherds and other materials representing two cultural periods namely Early Historic Period and Medieval period. Three trenches A1, A2 and ZB1 were laid at the top of the mound and exposed the deposit which extended beyond 6m. The first two layers (layers 1 and 2) measuring 2.50m are dump. Actual cultural material started appearing from layer 3 and ends up at layer 6. Two storage containers measuring about 85cm in height were found in trench A1 at the depth of 440cm. From one of the storage containers, six bone points were noticed intact at the bottom portion. Evidence of firing activity was traced over the storage containers. Charcoal samples were also collected from this layer.

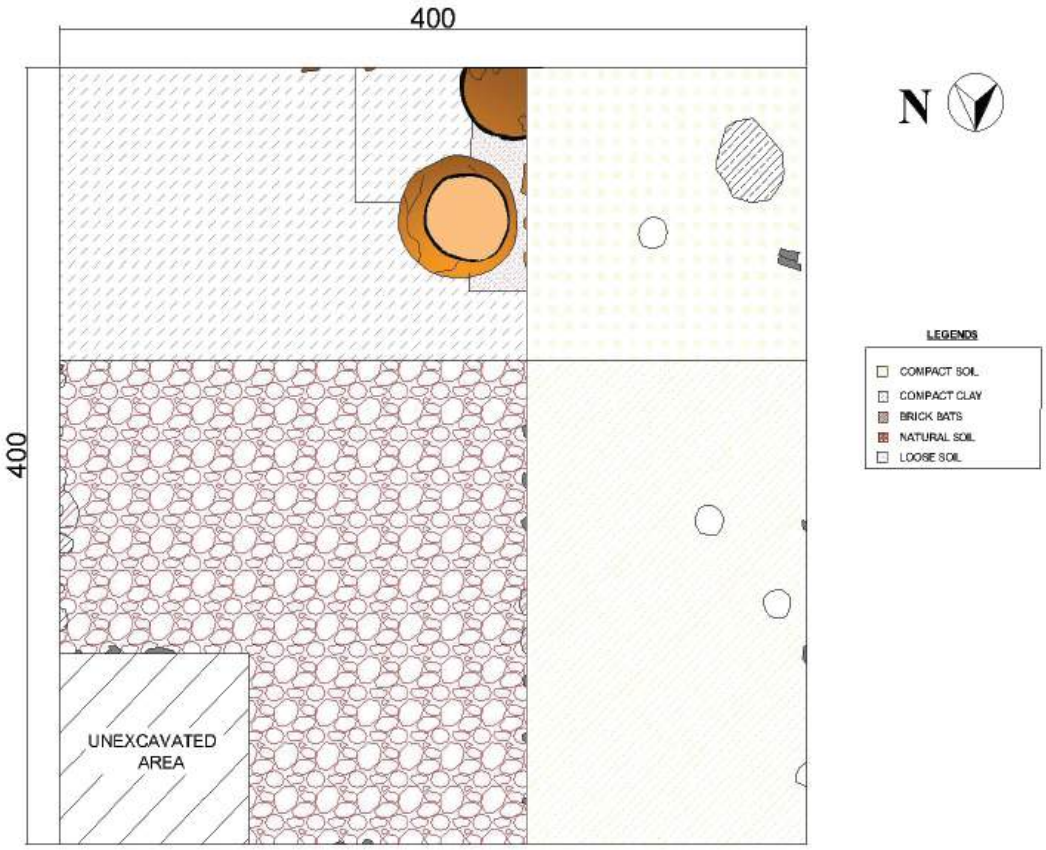

Fig. 4.6 Marungur: Plan drawing of trench A1

Fig. 4.7 Marungur: View of southern section of trench F1

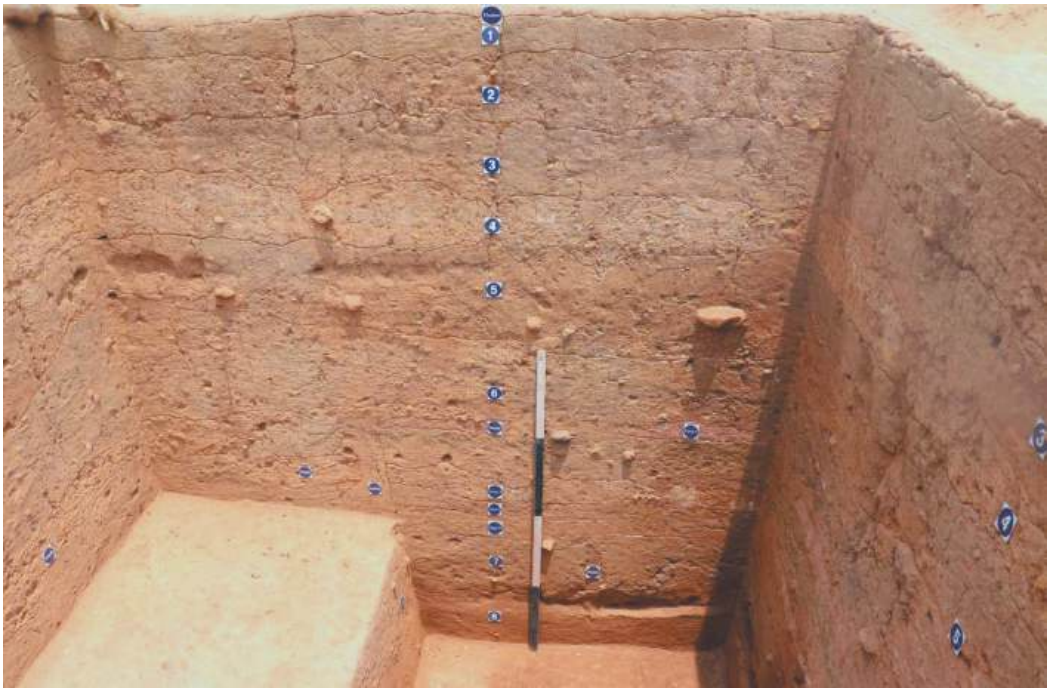

Fig. 4.8 Marungur: View of southern section of trench ZF7

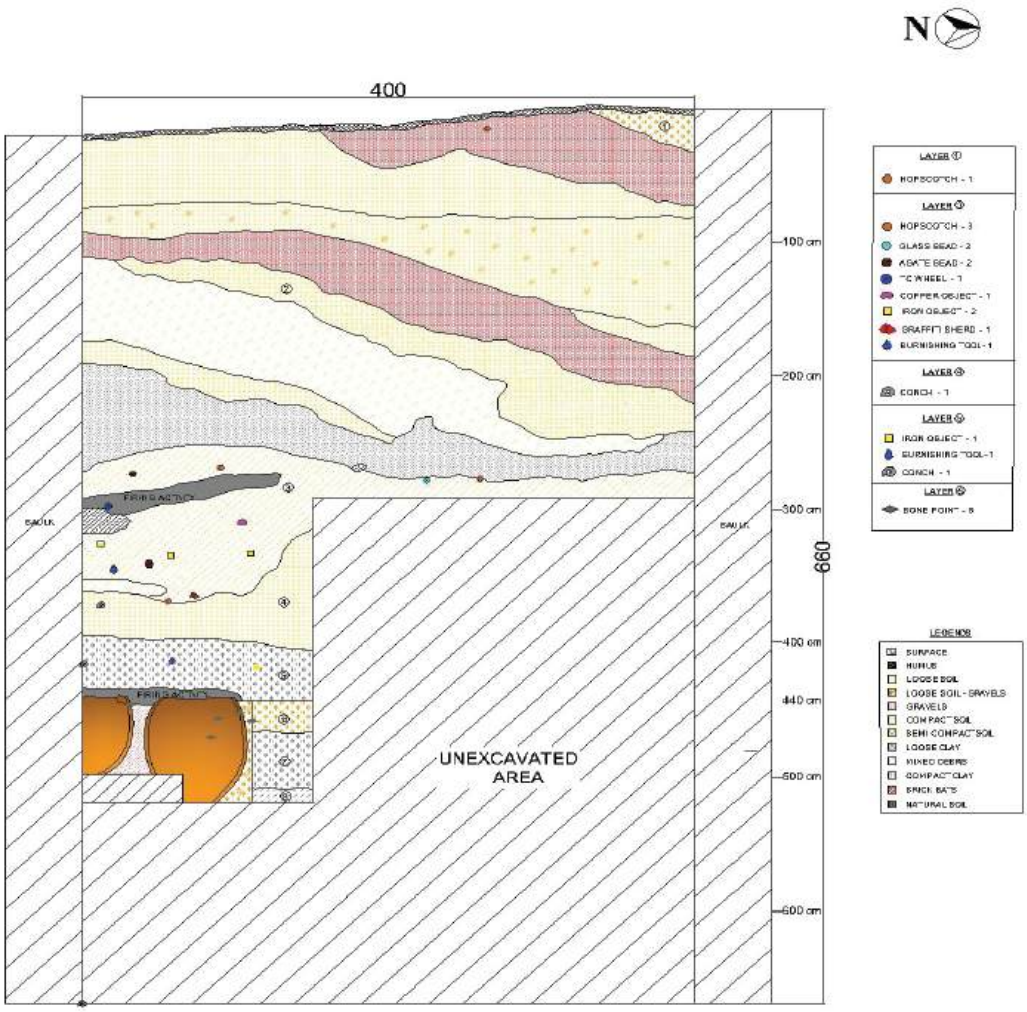

Fig. 4.9 Marungur: Section drawing of trench A1 (western section)

Fig. 4.10 Marungur: General view of trench A1

Fig. 4.11 Marungur: Storage containers and in situ position of bone points from trench A1

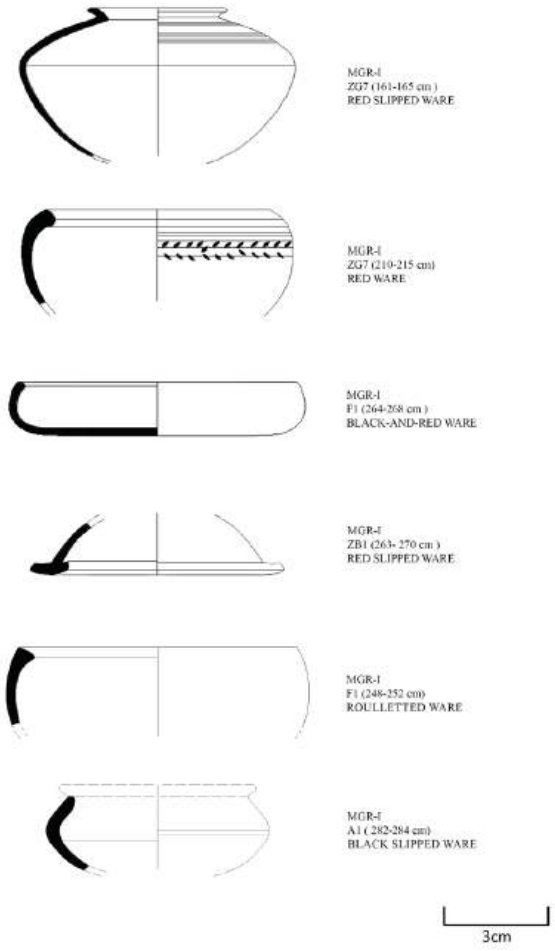

Fig. 4.12 Marungur: Pottery drawing

Potteries

Potsherds like red ware, red slipped ware, coarse red ware, black-and-red ware, rouletted ware, grey rouletted ware, brown slipped ware, perforated ware and 12 graffiti inscribed potsherds were collected and these were considered to be the significant findings of the excavation.

Fig. 4.13 Marungur: Rouletted ware

Fig. 4.14 Marungur: Pot exposed in the section

Fig. 4.15 Marungur: Graffiti inscribed potsherds

Fig. 4.16 Marungur: Burnishing Tools

List of Antiquities unearthed from the habitational site

S.No.	Antiquities	Units
1.	Copper- 09	
	Coin	01
	Antimony rod	05
	Bangle fragment	02
	Miscellaneous copper object	01
2.	Iron- 11	
	Nails	03
	Kinfe	02
	Arrow head	01
	Miscellaneous iron object	05
3.	Beads-16	
	Glass beads	06
	Quartz beads	01
	Carnelian beads	04
	Agate beads	03
	Terracotta beads	02
4.	Shell- 02	
	Conch raw material	02
5.	Stone- 03	
	Polished stone axe	01
	Miscellaneous stone object	02
6.	Terracotta- 37	
	Hopscotch	28
	Tarso	01
	Wheel	02
	Ring	01
	Gamesman	01
	Miscellaneous terracotta object	04
7.	Bone- 17	
	Bone point	17
Grand Total		**95**

Fig. 4.17 Marungur: Antimony rods

Fig. 4.18 Marungur: Iron objects

Fig. 4.19 Marungur: Beads

Fig. 4.20 Marungur: Bone points

Excavation at the Burial Site

Two stone circles (Meg.-I and Meg.-II) made of laterite stone were opened and 10 urns were unearthed.

Meg.-I

Stone circle made of laterite blocks with small laterite gravel packing measuring 8m in diameter was selected for excavation. After the removal of small laterite gravel, two stone circles were noticed. The first circle was noticed with medium-sized laterite stone blocks and the second circle was noticed with the larger size of laterite boulders. The stone circle was divided into four quadrants and excavations was carried out. Up to a certain depth, hard laterite stones were found. In the northeastern quadrant, an urn was exposed and a large capstone was placed in the central area entombing another urn. The urns were placed in the bedrock of laterite rock. This grave (Meg.-I) was exposed with two urns.

Fig. 4.21 Marungur: Stone objects

Meg.-II

Megalithic-II is marked with the stone circle where the capstone was removed already. Small laterite stones were found in the centre of the stone circle. The stone circle divided into four quadrants and excavations were carried out. A fine red soil layer was noticed beneath the layers of the laterite stones. In total, 8 red ware urns were exposed from the Meg.-II. The urns were found in various sizes at different levels. Iron swords were placed outside the two urns and iron objects are placed inside the urn. One of the urn contains, red colored stone beads along with graffiti bearing inscribed pots.

Offering pots

From the urn, various shapes of offering pots of black-and-red, red slipped, black slipped and red ware were collected.

Fig. 4.22 Marungur: General view of Meg.-I

Fig. 4.23 Marungur: General view of Meg.-II

Fig. 4.24 Marungur: Offering pots from Urn no. 5

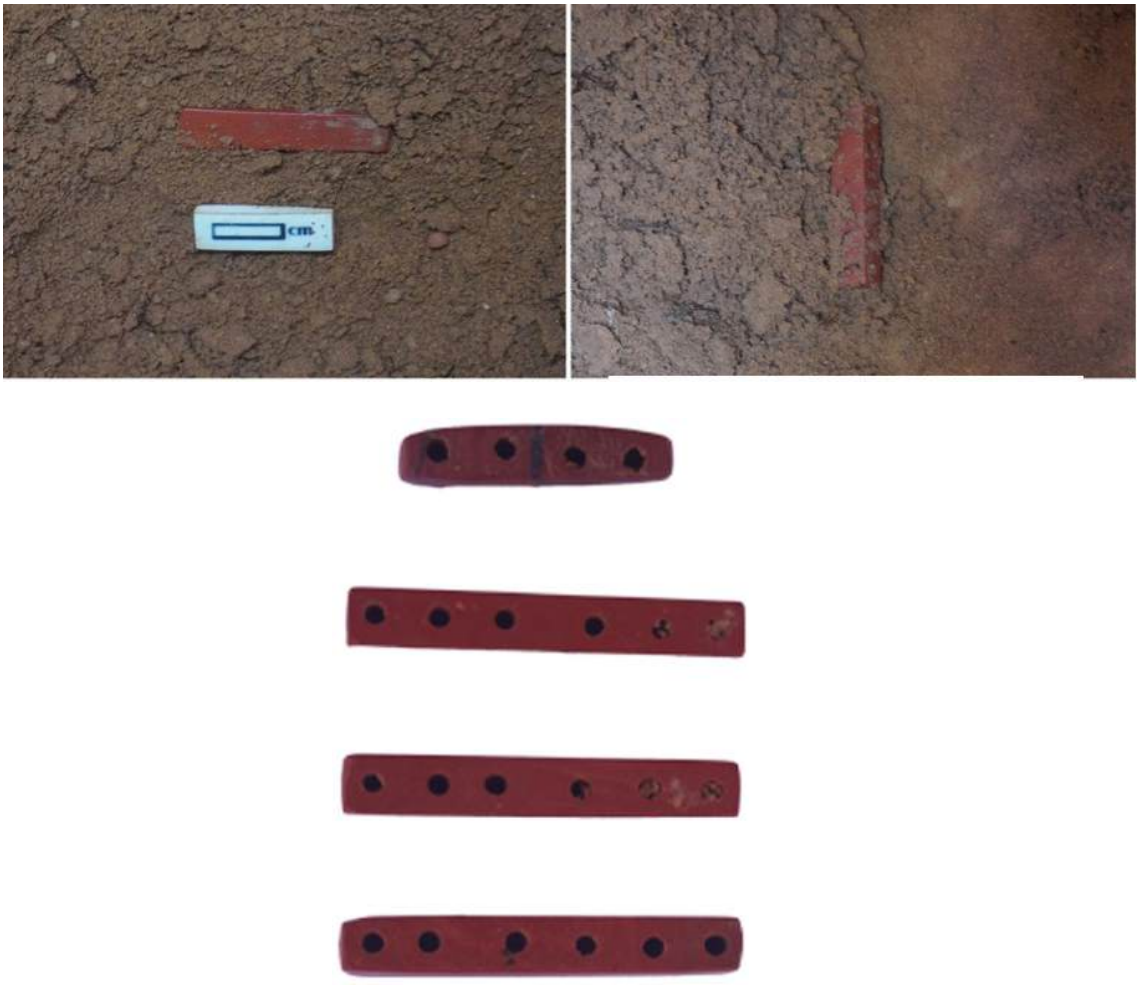

Fig. 4.25a Marungur: Beads from Urn no. 5

Fig. 4.25b Marungur: Beads from Urn no. 5

Fig. 4.26 Marungur: Offering pots with graffiti

Scientific analysis

The samples collected from the habitation cuttings and graves were subjected to Phytolith analysis, Archaeo-botanical analysis, Pollen analysis, Residue analysis and ancient Plant DNA analysis. Besides, samples were collected for OSL (Optically Stimulated Luminescence), TL (Thermoluminescence) and for AMS (Accelerator Mass Spectrometry)dating. The analyses are in progress and awaiting the results. The analyses will help to determine the chronology of the archaeological site and its formation process, the age of the artefacts and antiquities, the lifestyle and food habits. To date, two AMS calibrated dates were obtained, that are about 84 BCE and 87 BCE from the samples of the lower level suggesting that they are of the Early Historic Period.

Site	Laboratory No.	Trench/ Layer	Conventional Age in BP	Conventional Age	Calibrated Age
Marungur	Beta- 759205	A1/1	1950 ±30	0 BCE	87 BCE
Marungur	Beta-759206	ZB1/2	1990 ±30	40 BCE	84 BCE

Conclusion

The excavation at Marungur has revealed the cultural occupation from the Early Historic Period to the Medieval Period. Based on the antiquities, ceramics and other materials recovered from the excavation, bricks, roofing tiles and posthole activity revealed a clear settlement pattern in this region. The potteries unearthed from the site at various strata demonstrate the proper chronological sequence of pottery assemblage. The availability of rouletted ware and semi-precious stones like agate and carnelian proves both internal and external trade conducts during that time. Tamili inscribed potsherds recovered from a disturbed urn which existence of the Early Historic Period. Some of the ceramics resemble to the late phase of the Iron Age, particularly from the graves, however, further investigation of the site is required to know more about the site and its cultural potential.

Acknowledgement

We would like to express our enormous pleasure in thanking all the team members who were directly and indirectly involved in the excavation to bring out the buried historical values of Marungur village. I thankfully acknowledge the immense support from institutions, research scholars, independent researchers and individuals. Special thanks to the Archaeological Survey of India, Government of India for the approval and permission to conduct the excavation at Marungur.

We would like to express sincere gratitude to Research Scholars Mr. P. Arunkumar, Mrs. Gomathi C, Mr. Mullai Venthan K V K, Mr. G. Kumaravelu and Mr. B. Arockia Leo whose dedication, insight and hard work greatly contributed to the excavation as trench supervisors, pottery assistants and other documentation works. I would extend my appreciation to the students from the Tamil Nadu Institute of Archaeology and Museology (2023-2025) for their participation in the excavation as trainees. We would like to express our sincere thanks to the people of Marungur village for their cooperation, participation and contribution. Our special thanks to the landowners of both the habitation and burial site.

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Excavations at Keeladi

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M. Ramesh
R. Ajay Kumar

Introduction

Keeladi (Lat. 9°51'17.64" N; Long. 78°11'41.76" E) has become a significant archaeological site of the 21st century in Tamil Nadu, represents a buried urban settlement on the bank of Vaigai river during the Sangam era (Fig. 5.1). It encompasses an extensive cultural mound that spans a vast area of 110 acres nestled amidst lush coconut groves. The excavation conducted by the Tamil Nadu State Department of Archaeology at Keeladi was primarily aimed at gaining a comprehensive understanding of the urban civilization that thrived along the Vaigai river valley during the classical period. The intensive archaeological excavations focused on revealing numerous aspects of the ancient settlement, including contemporary environment, structural engineering, dietary patterns of the ancestors, technique of water management, the industries that existed, the lifestyle of the people, as well as their domestic and foreign trade practices and much more.

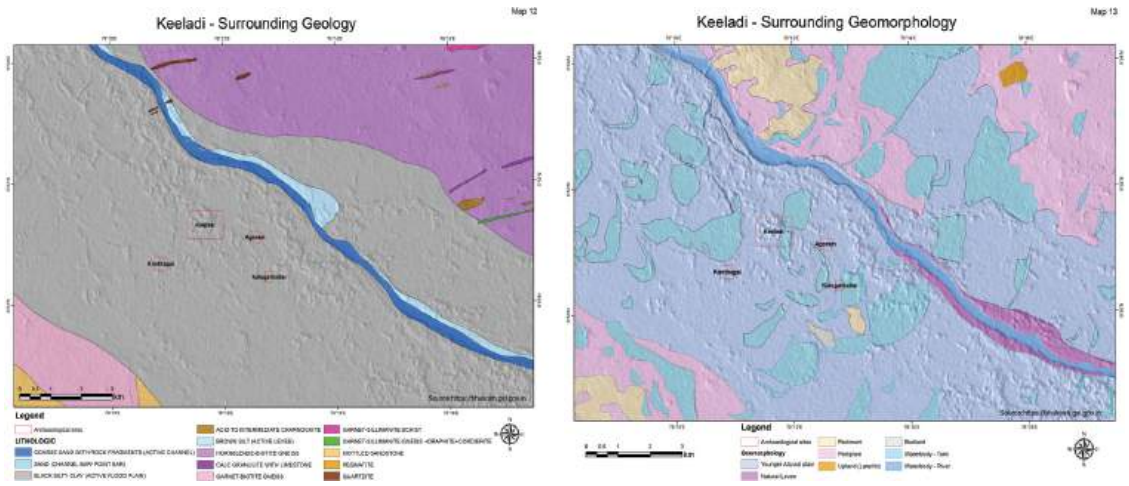

Fig. 5.1 Keeladi: Surrounding Geology and Geomorphology

In addition to Keeladi, the excavation activities also extended to two other sites within the vicinity, namely Agaram and Manalur. These sites, like Keeladi, identified as habitation areas for the ancient inhabitants of the region (Fig. 5.2). By excavating these catchment areas, archaeologists aimed to gather insights into

the origin of the people, broader urban network, contemporary industrialization, cultural dynamics of the area and any migratory patterns whatsoever. Apart from habitation sites, archaeological investigations were also carried out at a burial site, Kondagai provided valuable information about burial practices followed by the ancient residents of Keeladi. These three sites Agaram, Manalur and Kondagai are situated within a radius of 1km from Keeladi and have been considered part of a cluster since the sixth season excavations in 2020. They are regarded as distinct localities within the broader Keeladi site.

From the extensive excavations spanning ten seasons at Keeladi, five seasons at Kondagai, three seasons at Agaram and two seasons at Manalur archaeologists hope to uncover and understand the rich historical artefacts, structures and cultural remains that lie buried beneath the surface. The continued investigations serve as a testament to the commitment and dedication of the Tamil Nadu State Department of Archaeology in unravelling the urban settlement that prospered during the Early Historical Period and preserving the heritage of Keeladi and its surrounding localities.

Overall, the excavations at Keeladi, Agaram, Manalur and Kondagai have contributed significantly to our understanding of the ancient urban settlement that flourished along the river Vaigai. These archaeological ventures have unambiguously illuminated various aspects of the civilization, advancing our comprehension of the literacy of common man, antiquity of Tamili script, the economic activities, cultural practices and settlement pattern offering a glimpse into the rich heritage of the region. At present, the systematic archaeological excavations of the tenth season are in progress.

Cultural Significance

The archaeological mound situated at Keeladi (Lat. 9°51'00.29" N; Long. 78°11'00.69" E) found 1km southeast of the current Keeladi village and west of the Manalur irrigation tank. This mound is referred by the local name *Pallichandai Thidal,* means a mound or elevated place at *Pallichandai.* The mound is also called as *Mettu Punjai,* an elevated agricultural land and *Vadakku Thidal,* a mound located north of the village. The mound is located amidst agricultural land on the northeast of Kondagai village near Pallichandai Pudur. Hence, the different nomenclatures provided for the mound palpably well-suited for the study area. The multiple random pedestrian surveys undertaken within the extensive

boundaries of the archaeological mound of Keeladi having the highest altitude of 127.74m and the lowest of 113.02m from MSL yielded a number of terracotta hopscotches, terracotta gamesman, spindle whorl, iron objects, graffiti-marked potsherds and potsherds of diverse typology. This includes black-and-red ware, black ware, black slipped ware, red slipped ware, red ware and coarse red ware, etc. These potsherds found scattered all over the archaeological mound without any specific concentration at one place or any abnormal occurrence or absence in the mound noted during the course of the survey. This may because the mound is situated on a coconut grove and regular cultivation activities in the region resulted in such occurrence of potsherds. In course of exploration, brick structures were traced in two wells. The geolocation of the two wells respectively is Latitude 9°51'14.51" N and Longitude 78°11'41.66" E; Latitude 9°51'18.47"N and Longitude 78°11'42.62" E. Within the wells dug amidst the mound in Keeladi, brick activities were found in the northern section of the wells.

A pond located within the archaeological mound, having geolocation as Lat. 9°51'12.18" N and Long. 78°11'34.62" E, known as *"Chokkattan Uruni",* yielded number of potsherds ranging from black-and-red ware to coarse red ware and hopscotches, spouts, lid knobs were also reported amidst this assemblage of potsherds. Moving further south about 400m from this pond revealed a potential cultural deposit located on the southern periphery of the mound. In the surrounding regions of the Kuraloviyam School that is situated on the southern fringe of the archaeological mound, antiquities like stone pestle, terracotta made gamesmen, spindle whorls, wheels and hopscotches, were reported amidst assemblage of potteries such as black-and-red ware, black ware, black slipped ware, red slipped ware, red ware and coarse red ware, etc. The cultivation land in this part of the mound remains intact with ploughing at top surface that penetrates about a feet while the region where brick chamber exists shows heavy disturbance. The southern boundary of the mound is ascertained right over the road that connects Kondagai and Agaram where a complete absence of cultural materials is observed. Further south of this road another brick chamber exists where no cultural assemblage or potsherds were noted on the surface.

The site Agaram geographically located at Lat. 9°51'5.45" N and Long. 78°12'33.57" E, revealed a greyish silty deposit spread amidst the black soil farm lands and local residence that was contrastingly perceptible over the course of survey. Red ware and red slipped ware potsherds in considerable numbers and

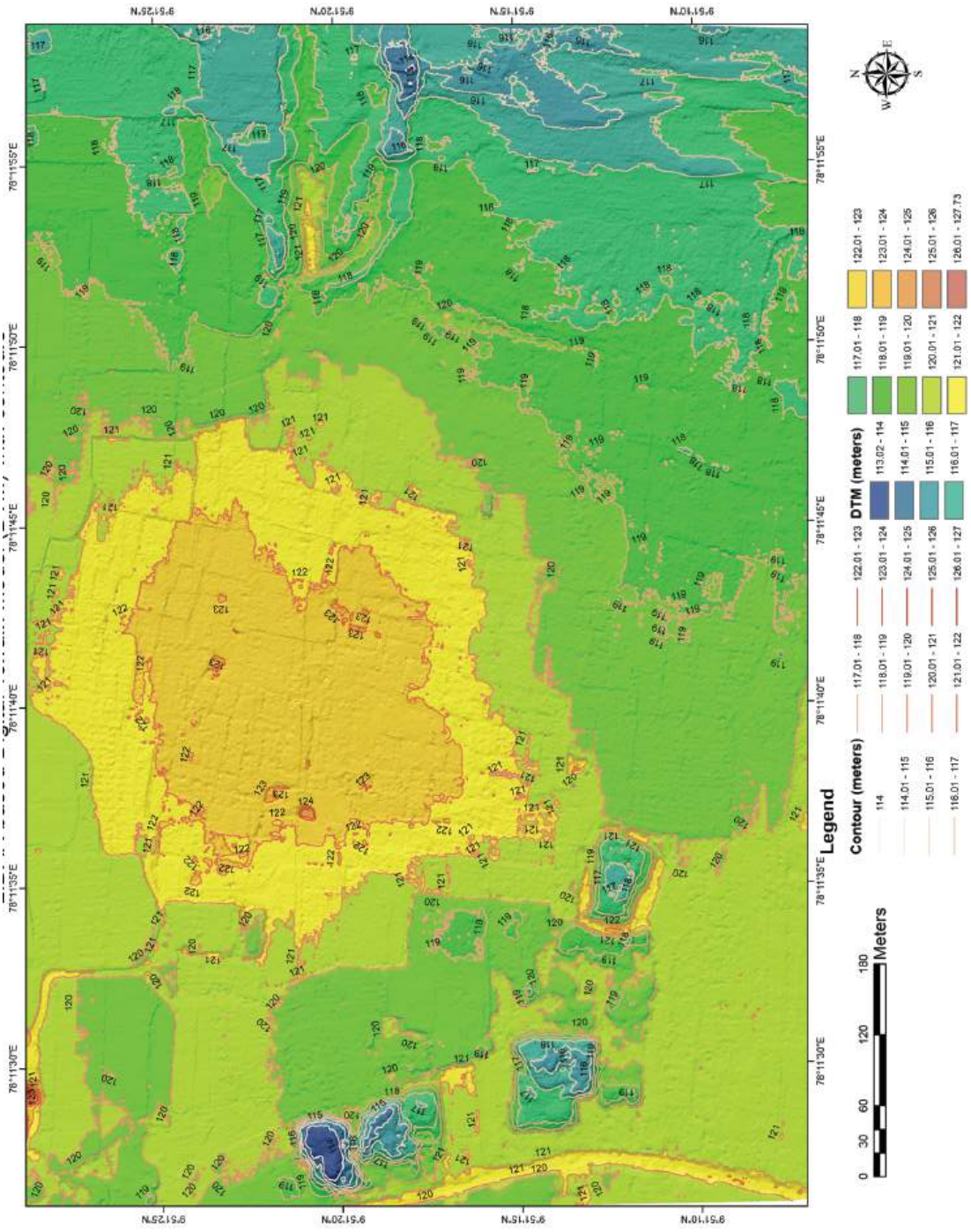

Fig. 5.2 Keeladi: LIDAR based Digital Terrain Model (DTM) with contours of Keeladi Excavation site

tiny-sized potsherds of black-and-red ware were observed on the ground surface within this small archaeological mound. This cultural mound clearly showcased the habitation in the course of survey.

Manalur having geolocation of Lat. 9°51'52.72" N and Long. 78°12'41.10" E, presumed as old Madurai by folk tradition, having mentions in medieval literature and inscriptions was explored. Along the eastern banks of Manalur tank, archaeological remnants manifested as architectural elements of a Siva temple, approximately dated back to the 8th to 9th century CE had been reported. Adjacent to these remnants, a partially buried Nandi sculpture was also discovered, displaying stylistic characteristics indicative of the Early Pandya Period. The archaeological mound at Manalur was still continuously occupied since medieval times and as a result the village showed no presence of artefacts on the surface but a ring-well spotted on the section of a canal that streams across the village from Vaigai river and excavations undertaken on its adjacent area.

Kondagai (Lat. 9°50'41.87" N and Long. 78°10'51.07" E) with the presence of medieval-period temples it is established that the village flourished well during the medieval period. The burials at Kondagai are a reflection of long-stretched burial customs practiced in the ancient past. During the initial phase of excavation by the ASI, it was verified that the burial site was indeed linked to the Keeladi habitation mound. This confirmation was reinforced through a meticulous reevaluation, considering factors such as distance and shared attributes between the burial site and habitation deposit. A slabbed stone bears an inscription dated back to approximately the 16th century CE. This reaffirmed the connection between the burial site and the Keeladi habitation. Adjacent to Kondagai lies another modest habitation mound locally referred to as Ottankalachi. This mound spans an area of 5 acres and holds a cultural deposit measuring 1-1.5m in depth. The pottery unearthed from this habitation mound comprises varieties such as red ware, black-and-red ware and black ware featuring assorted shapes including pots, bowls and dishes.

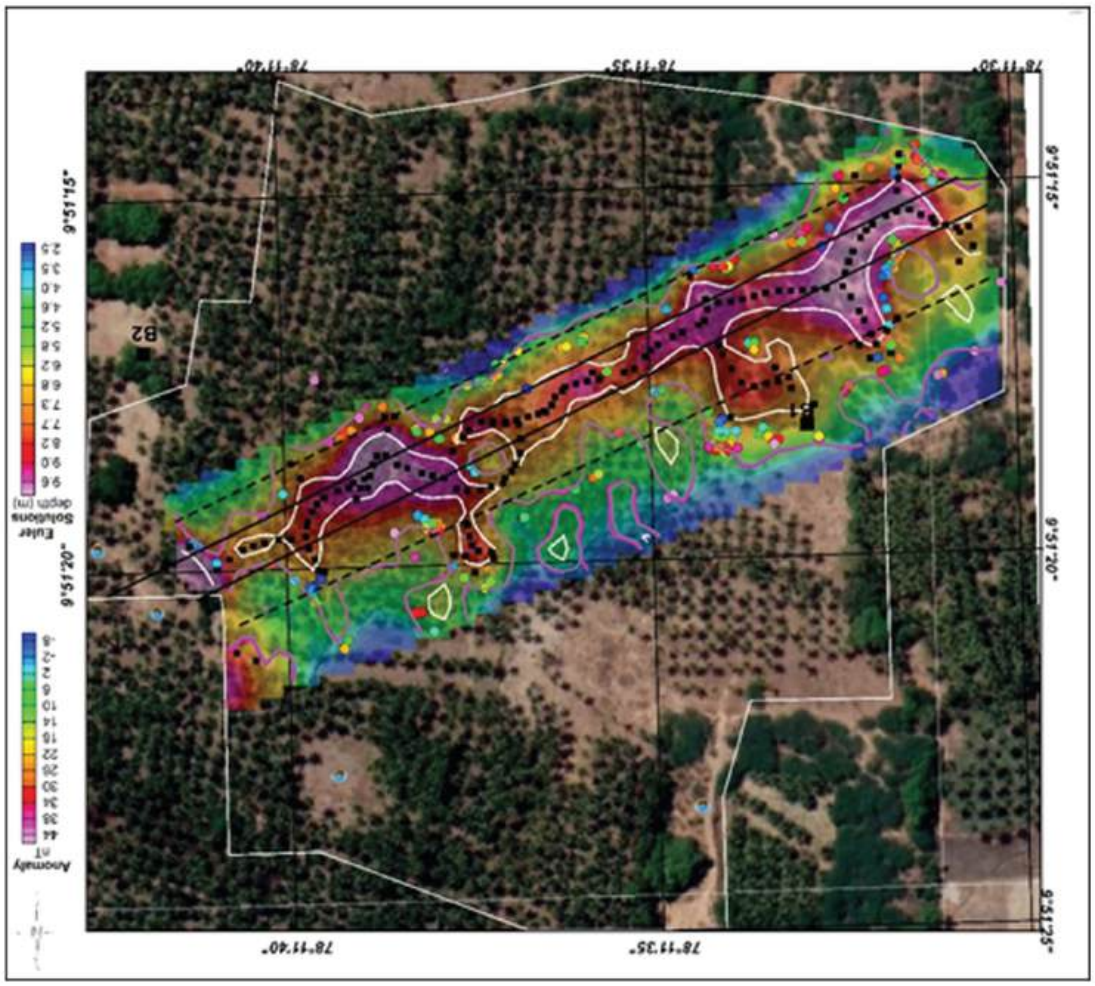

Fig. 5.3 Keeladi: RTP map enhancing short wavelength anomalies enclosed by the white rectangle superposed on Google Map. Black filled boxes show the axis of the magnetic high. Magenta and grey lines respectively, represent the zero contour of the tilt derivative and the first vertical derivative. White line shows the tilt derivative with contour value 1. Coloured filled circles are depth to the top of the sources computed using the Euler deconvolution technique. Dashed lines represent the possible outer boundary of the sources and full lines inner limit

Overall, the field exploration on the archaeological mounds of Keeladi and its cluster sites, allowed us to systematically gather information about the distribution, nature and significance of archaeological materials on the surface (Fig. 5.3). This method helps to build a comprehensive understanding of past human societies and their interactions with the environment and helps formulate the excavation plan and structure further investigation that is required to be carried out on the sites.

Historical significance

Sangam literature, particularly *Paripatal* from the eight anthologies, vividly describes the natural beauty of river Vaigai, its cultural significance, role in

shaping the landscape of Madurai and sustaining its people. Keeladi, situated on the southern banks of river Vaigai and in close proximity to Madurai as well *en route* from Alagankulam, a port city of Sangam Pandyas, materials from the excavations at Keeladi cluster portray the lifestyle of the people in the Sangam Age i.e. Early Historical Period, where descriptions found in the Sangam literature greatly align with archaeological findings at Keeladi, lending credibility to the historical accuracy of Sangam texts.

During the medieval times, one can see several epigraphical records in Keeladi, Kondagai and Manalur. Yoganarasimha temple at Anaimalai, Madurai bears an inscription dated to 13th century CE. A record from the 23rd regnal year of Pandya king *Maravarman* alias *Tirubuvanachakravartin Kulasekhara* at Muchukunda Tiruviramesvaraudaiya Nayanar temple (also called Arjunesvara temple) notes *Kupakaraya,* son of *Malavaraya,* reconstructing the temple east of Velur tank, fed by the Vaigai river (ARE 1905: B-740). Another record from 1919 (ARE 1919: B-447) at *Pallichandai,* Keeladi mentions *Kupakaraya* consecrating images of *Kuttadevar* and his consort in 22nd regnal year of king. In the 30th regnal year, an inscription from the same temple records the sale of land by the *sabha* to *Kuttan Tennadan* alias *Tribuvanasingadeva* of Kannanur (Tiruchirapalli) (ARE 1905: B-449). The village, encompassing Keeladi and Kondagai, was a *devadana* of *Mudivalangu Pandya Isvaramudaiya Nayanar.* A stone inscription from 1882 near a channel in Keeladi, recorded by Robert Sewell, documents the construction of channel during the 22nd regnal year of *Kulasekara Pandya,* written in *Grantha* and Tamil (Sewell 1882: 294; Madurai Kalvettukal-I 2005: 167).

The Vishnu temple at Kondagai, contemporaneous with the Siva temple, met with inscriptions. Due to renovations, many inscriptions are lost, but a loose slab from the late medieval period was found near Kondagai *kanmai* (tank). Manalur inscriptions from the 10th -11th centuries CE, such as one from Erichavudaiyar temple (12th year of *Virapandya,* SII XIV: 95-6), mention *Maṇalūrk-kuḷakkiḻ* and *Ranasingha-Mangalam,* a village likely supplied by the Manalur Tank, fed by the Vaigai. Another from Koneriswarar temple (c.1045 CE, Kanyakumari Kalvettukal 1: 119) records *Maṇaṟkkaṭan* of Manalur donating 50 sheep for a lamp.

Inscriptions from the 13th century at Kallalagar temple (5th year of *Maravarman Sundara Pandya,* c.1222 CE, ARE 1929-30: No. 282) and Sengamala Nachchiyar temple (9th year of *Jatavarman Kulasekharadeva,* c.1200 CE, ARE 1922: No. 543) mention *Perumanalurin Anda-nadu.* The latter records the creation of *Kulasekharachaturvedimangalam,* a *brahmadeya* village. An inscription at Chaitranatha Vallabha Perumal temple (11th year of *Jatavarman Srivallabha,*

c.1132 CE, ARE 1908: No. 318) records the reinstatement of *devadana* (land donated to temples) lands in *Kulasekharamangalam,* purchased by *Chittakutti Madavan* from the village *sabha* (committee). At Viswanatha temple (3rd year of *Konerinmaikondan,* ARE 1902: No. 409) and Srinivasa Perumal temple (13th year of J*atavarman Kulasekharadeva,* c.1212 CE, ARE 1940-41: No. 235), minister of *Perumanalur Raman* alias *Pallavarayar* is noted as a signatory, indicating his administrative role. At Agaram, an 18th century inscription and Iron Age potteries were found near a cultural mound.

Excavations at Keeladi, Kondagai, Agaram and Manalur, selected not merely for their proximity to Madurai and the Vaigai river, but the elaborate materials recovered in explorations with numerous research questions about the past settlement and confirm historical significance of the region. The findings corroborate the literary and epigraphical records, highlighting cultural and administrative importance of the area during the Early Historical Period.

Previous investigations, both explorations and excavations

Limited archaeological work occurred before Independence in the Vaigai valley. In 1888, Alexander Rea conducted sporadic diggings at Paravai and Anuppanadi near Madurai. The Archaeological Survey of India (ASI) Southern Circle in 1950s began systematic village-to-village surveys in Madurai, Tirumangalam, Melur and Periyakulam taluks identifying numerous archaeological sites (Raman 1950). Studies by Allchin and Zeuner on Mesolithic culture prompted further exploration. K. S. Ramachandran (ASI) found urn burials at Samanattam, Palanganattam, Vilangudi and Paravai and habitation sites in Madurai city (Koilmedu, Silaiman, Madakulam, Nattamedu). The archaeological and epigraphical explorations conducted in Vaigai river valley by B. K. Gururaja Rao, K. V. Raman, K. Rajan, V. Vedachalam, C. Santhalingam, P. Balamurugan and many other scholars of various institutions such as Archaeological Survey of India, Tamil Nadu State Department of Archaeology, Tamil University and Pondicherry University between 1960 and 2000 brought to light more than 500 archaeological sites demonstrating the rich archaeological potential of the valley from Middle Palaeolithic times to the Historical Period (Robert Sewell 1882, Francis 1906, Foote 1916; Krishna Sastri 1919, Subramanya Aiyer 1924, Mahadevan 1968; Subbarayalu 2008:209-248; IAR 1956-57:80-81; Gururaja Rao 1972:86; Vedachalam 1985; Selvakumar 1996:27-42; Sridhar 2004:29-35; Rajan et.al 2009:46; Rajan 2007:118-119; Rajan 2007:164-167; Sridhar 2004:29-35; Rajan and Balamurugan 2019:60-62). The Tamili (Tamil-Brahmi) cave inscriptions found in rock shelters and earliest inscribed memorial stones of India found at

Pulimankombai and Thathappatti received a special attention of scholars. Nearly 153 Tamili inscriptions engraved in rock shelters (58 cave inscriptions, 4 memorial stones, 84 inscribed potsherds and 7 gold objects) from 23 sites were documented on the ancient trade routes imply the political, cultural and economic significance of the archaeological settings of the valley.

Surveys by B. K. Gururaja Rao and K. V. Raman identified microlithic tools (jasper, chalcedony) and urn burials in the upper Vaigai river. Works of K. V. Raman along the Marattar river (T. Puthupatti, Sivarakkottai) classified flake scraper tools as Middle Stone Age, precursors to microlithic tools, distinct from Teri sites (Tirumangalam, Usilampatti, Tidiyan, T. Kallupatti). research of V. Selvakumar in the Upper Gundar basin in villages around Usilampatti, Tirumangalam and Peraiyur suggested a direct transition from Mesolithic to Iron Age culture, bypassing a Neolithic phase, based on surveys and trial diggings. Over 200 early historical sites were identified (Rajan et al. 2006, 2019). ASI explorations in Vaigai Valley were identified with 293 sites (IAR 2013-14), including habitation sites like Kaliyandur, Enadi, Sakkimangalam, Allinagaram, Tiruppachetti, Tuthai, Maranadu, Pacheri, Vembattur, Vagudi, Alagapuri, Uruli, Rajagambeeram, Kattikulam, Sudiyur and Kallikkudi. Uruli is notable for menhirs and urn burials and Alagapuri for terracotta coffins. Only Alangankulam, located at the mouth of river Vaigai has seen limited excavation. Buddhist and Jain settlements along the Vaigai (Tirupuvanam to Ramanathapuram) indicate trade centres and religious sites, supported by Buddha images at Kizpartibanur, Jain images at Sudiyur, Arungulam and Kumarakurichi and trade-related finds like celadon, porcelain and rouletted-ware at Kallikkudi, Gandhi Nagar, Kamankottai, Valasai and Landai.

Keeladi Excavations by ASI

First reported in 1976 by a local teacher, proximity of Keeladi to Madurai, fertile landscape and an isolated brick structure led ASI to excavate in 2014–15. Three seasons of excavations uncovered brick structures, terracotta ring-wells, pipes, hearths, Tamili-inscribed potsherds and over 5,200 antiquities, including 40% glass beads (Ramakrishna et al. 2018). Brick Structures found in Locality-I (eastern fringe and central well) and Locality-II (500m west), with brick sizes of 36 x 24 x 6cm, 33 x 23 x 6cm and 34 x 24 x 7cm. Structures emerged at ~1m depth, with a maximum height of 165cm (24 courses northwest, 13 southwest in Locality-I). Notable finds include two tank-like structures with brick channels, a double-walled furnace with ash and artefacts like terracotta discs, bones, black-and-red ware potsherds and a red ware basin. A black-and-red ware dish at

100cm depth bore the Tamili inscription reading centanavathi likely to be the name of the owner. Predominantly indigenous pottery types, including coarse red ware, red slipped ware, black-and-red ware, white painted black-and-red ware, black ware, russet coated painted ware, white painted red ware, matt impressed ware, perforated ware and rouletted-ware. Over 600 potsherds with post-firing ligatured graffiti (ladders, fish, spirals, swastikas, etc.) and 70+ Tamili (Tamil-Brahmi) inscriptions datable to 2nd century BCE–1st century CE (Ramakrishna et al. 2018). The potsherds record names like *atan, tisan, utiran, centanavathi* and Prakrit names like *rajakatasa* and *guthasa* (possibly Sri Lankan, linked to a lead coin from Akurugoda, Sri Lanka). These reflect Tamil, Prakrit and adapted Prakrit languages, offering insights into cultural and linguistic dynamics.

Present Excavations

Habitation Cuttings

Keeladi

Over seven excavation seasons from 2017-18 (Season 4 to Season 10), the Tamil Nadu State Department of Archaeology carefully dug at the Keeladi archaeological site (Fig. 5.4). The site was split into 10x10m squares labelled with letters and numbers for easy tracking, divided into four areas called Localities I, II, III and IV. Each square was further split into four 4x4m sections to gather detailed information. At first, the digging area was 4.25 x 4.25m, but after rain caused erosion, it was reduced to 4 x 4m in later seasons to keep the walls stable. The goal was to explore the southern part of the mound and continue work started by the Archaeological Survey of India, though some sections were smaller due to fences or coconut trees. In Locality- I, 144 quadrants were dug out of 63 trenches, covering trenches labelled as A1, A2, A3, A4, A5, B1, YB4, YC3, YC4, YD3, YD4, YD5, YD6, YE6, YF4, YG3, YG4, YI8, YL8, YM8, YO8, YP4, YP5, YP6, YP7, YP8, YP9, YP10, YQ4, YQ5, YQ6, YR6, YS8, YT8, YT9, YU8, YU11, YV11, YW11, XA7, XF17, XF18, XF19, XK17, XK13, XM9, XM10, XM12, XM13, XM14, XM15, XM16, XM19, XN20, XY7, XY8, XY9, XZ2, XZ7, XZ8, XZ9 and ZB5. Locality-II had 17 quadrants dug in trenches V6, V7, W5, W6, W7, W9, X8, X9, Y4, Y6, Z7 and Z8, building on earlier findings. Locality- III had just one empty quadrants (YY10) and Locality-IV had two Z1 and Z2. The empty quadrant implied the absence of cultural deposit more apparently the gaps within the archaeological mound. Most work focused on Locality-I, the highest part of the mound, showing continuous building activity and scattered remains.

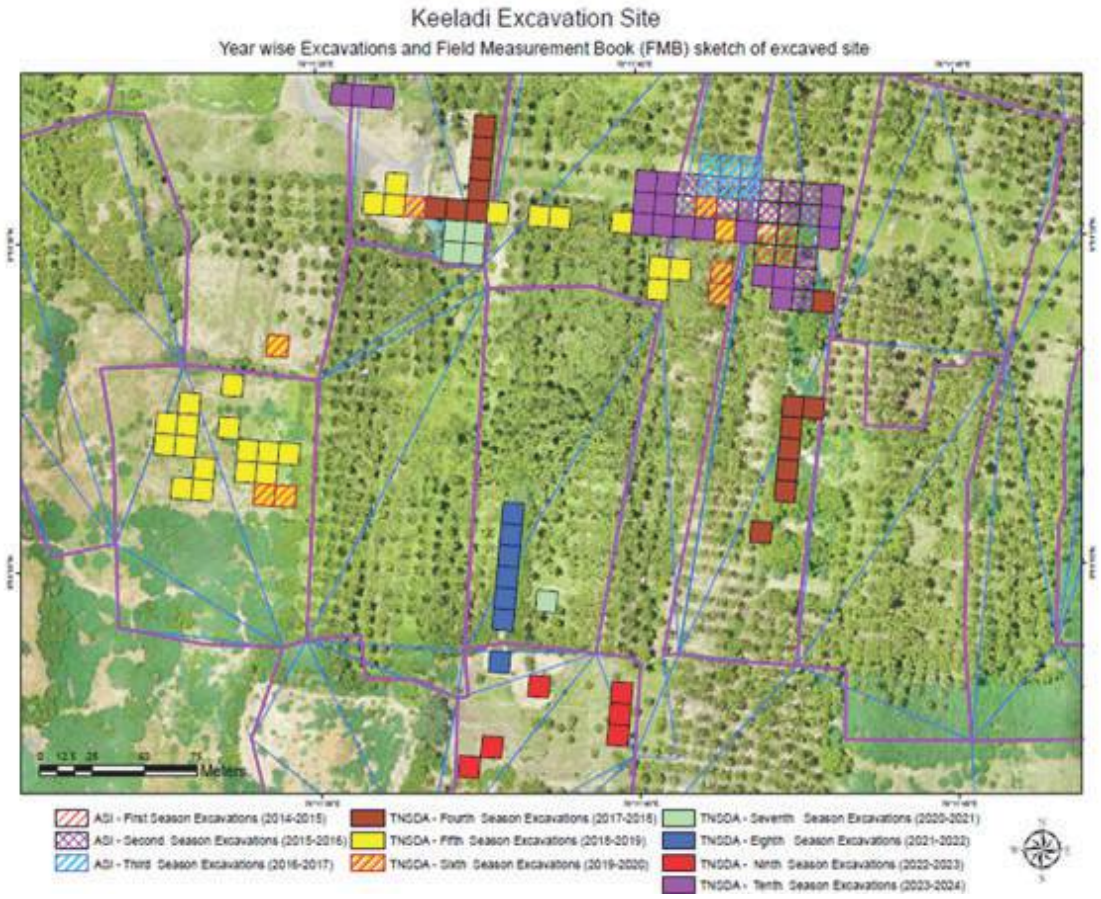
Keeladi Excavation Site
Year wise Excavations and Field Measurement Book (FMB) sketch of excaved site
Meters
ASI - First Season Excavations (2014-2015)
ASI - Second Season Excavations (2015-2016)
ASI - Third Season Excavations (2016-2017)
TNSDA - Fourth Season Excavations (2017-2018)
TNSDA - Fifth Season Excavations (2018-2019)
TNSDA - Sixth Season Excavations (2019-2020)
TNSDA - Seventh Season Excavations (2020-2021)
TNSDA - Eighth Season Excavations (2021-2022)
TNSDA - Ninth Season Excavations (2022-2023)
TNSDA - Tenth Season Excavations (2023-2024)

Fig. 5.4 Keeladi: Year-wise Excavations and Field Measurement Book (FMB) sketch of the excavated site

The fourth season started with 15 trenches (A1, A2, etc.), marking 34 quadrants for digging, including A1/4 and A2/2. As excavations went deeper than 300cm, new trenches YP6 to YP10 were added in the northwest of the mound, also split into four quadrants each. Walking south, you could see the ground drop about a foot every 60m, a slope in the archaeological showing the maiden trench was the highest point in the altitude of archaeological mound, which matched the soil layers found. In the fifth season, 51 quadrants across two areas were dug in trenches like XY7, XZ2, V6 and W5 showing connected findings. Later seasons aimed to follow building patterns, with 20 quadrants in eight trenches (including YD5/1) in one season, nine in five trenches (with XK13 southeast) in another, 10 in seven trenches (XM9, XM10, XM12) in the next and 14 in three areas (XF17, XF18, XK17) in the ninth season (Fig. 5.5). These digs used a horizontal approach to uncover cultural layers, focusing on brick buildings and natural soil levels, revealing a farmed area with a mix of river-fed and rain-fed water tanks.

The excavations disinterred many items like fine pottery (bowls, jars, dishes), utilitarian tools, glass, gold and semi-precious stone made jewellery and household goods hinting at daily life and trade. Graffiti and inscribed pot pieces showed literacy, personal marks or ownership names, reflecting early writing and communication. These findings, tied to major ancient buildings possibly industrial workshops, give a clear picture on the past life of the community and their culture from over 2,600 years ago.

Fig. 5.5 Keeladi: Aerial view of the excavations

Kondagai

The first phase of digging at Kondagai focused on areas where urns were found (Fig. 5.6). Twelve trenches were set up, but only nine were fully dug, along with four sections. Seven 10 x 10m trenches A1, YA1, YA2, YA3, YA4, YB1 and YC1 were excavated completely, with a 9 x 9m dig area. Eight 4 x 4m quadrants O6/3, O6/4, O7/1, O7/2, O7/3, O7/4, ZA1/4 and ZB1/4 and two halves of a

trench ZB1/1, ZB1/2 measuring 4 x 9m were also dug, reaching 100-120cm deep. This uncovered 48 urns and 27 extended burials. Bones and related items were collected and sent for lab testing. In the second phase, digging moved to the east of the first season area. Four 10x10m trenches C1, ZC1, ZD1 and ZE2 were fully excavated with a 9x9m dig area and six 4x4m quadrants ZC2/2, ZC2/3, ZD2/2, ZD2/3, ZD2/4 and ZE1/1 were dug, also to 100-120cm deep. This revealed 31 urns, 17 extended burials, 10 graffiti marks on pottery and 3 iron tools. A recent brick structure was noticed in ZD2. Bones and items were collected for analysis. The third phase, starting 80m east of the first season and 800m east of the second, focused on the eastern mound. Two 10x10m trenches ZO3 and ZP3 and two 5x5m sections ZO2/1 and ZO2/2 were dug, with 9x9m and 4x4m areas respectively, near trench O7 (70m north, separated by Pottapalayam road). Four trenches ZO2, ZO3, ZP3 and ZQ3 were laid, but only ZO3 and ZP3 were fully excavated. This uncovered 59 urns, some offering pots and iron slag. Bones and items were sent for testing. In the fourth season, sections ZQ2/4 and ZQ3 were dug, finding only urn burials, unlike the extended burials of earlier seasons. The fifth season excavated the southern half of ZQ4, also finding urn burials. The trench situated immediately adjacent to the places excavated previous seasons. In total over 150 urn burials were unearthed at Kondagai excavations.

Agaram

Explorations around the Agaram mound in Kalugerkadai taluk, Sivagangai district, showed it holds cultural treasures from early historical to medieval times (Fig. 5.7). Surface surveys found tiny pieces of black-and-red ware and red slipped ware pottery. The first excavation season started near the Kottaiveeran temple, 44m south and 133m west of its southwest corner, east of the Government Primary School and Pillaiyar temple, separated by a north-south road. Workers cleared thorny bushes and vegetation, marking a 10x10m area with a 1-m buffer as baulk, leaving four quadrants to dig: A1/1 (northwest), A1/2 (northeast), A1/3 (southeast) and A1/4 (southwest). Digging began in A1/2 and A1/4, uncovering red slipped ware, red ware and some coarse black-and-red and black ware pieces. In total, nine quadrants were excavated across four trenches A1, B1, B2 and C2.

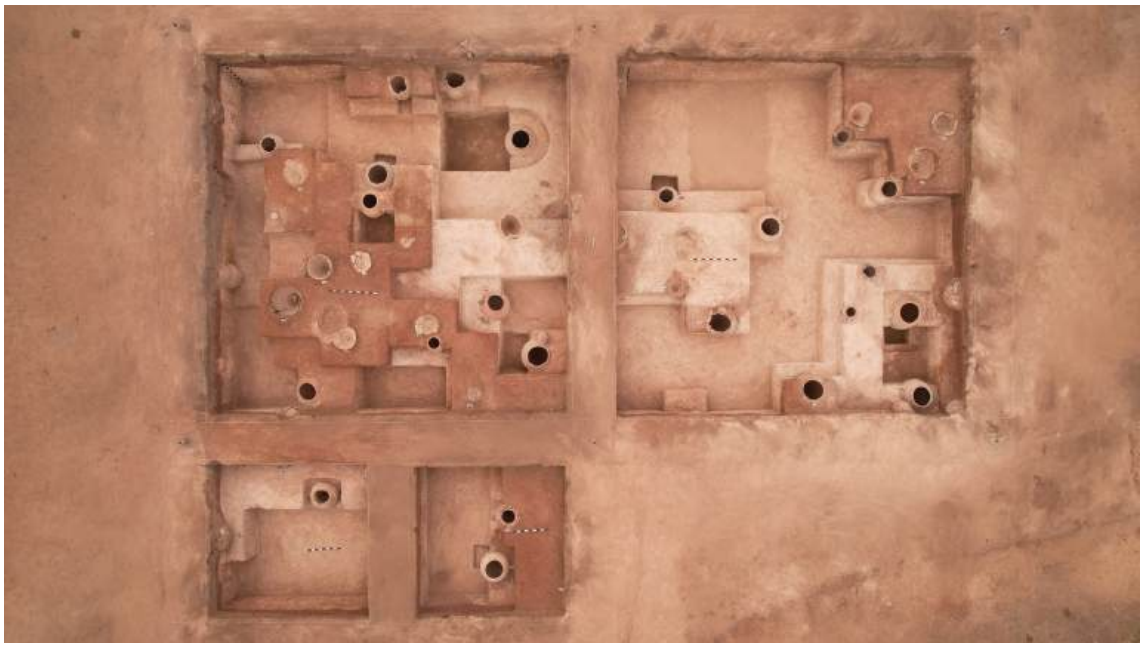

Fig. 5.6 Kondagai: Aerial view of Excavations showing exposed urn burials

The next phase of excavation season work resumed on unexcavated parts from the previous season. Six trenches B2, B3, C1, C2, D1 and D2 were laid out and eight quadrants were excavated. In the third season digging continued on the southeast side of the mound. Trenches C3 and C4 were added next to last year digging area. Work began in C3/3, revealing four cultural layers under topsoil, including a pit in the north. Four trenches A4, B4, C3 and C4 were laid and six quadrants were excavated. Trenches A4, B4 and C4 sat about a meter lower than A3, B3 and C3, with a steep slope between them, meaning the top layers were missing in the south. Finds included microlithic tools (flakes, cores, tools, potlids), glass and shell made beads and bangles. Charcoal, shells, bones and iron slag were also recorded here, providing insights into the history of the site.

Fig. 5.7 Agaram: Terracotta Ring-well from excavated Site

Manalur

The datum point was set using a shutter built by John F. Millar in 1910, located on the northern side and a railway track 400m south, running from Madurai to Rameshwaram via Silaiman, Manalur and Tirupuvanam. The datum was placed 25m diagonally southeast from southeast corner of the Periya Muniyandi temple, near the first sluice shutter that controls water flow to villages like Agaram and Manalur. A reference peg was set 106.4m west of the shutter, with a 5m south turn, landing on the northwest edge of Azhagumalar school ground. From there, the first 10m x10m trench was marked 170m south of the shutter, using four pegs at the northeast, southeast, southwest and northwest corners, with the northwest as the datum.

A 1m baulk was left around and across the trench, dividing it into four 4m x 4m quadrants. Four trenches A1, A2, B4 and YC3 were laid and six quadrants were dug: A1/2, A1/4, A2/1, B4/2, YC3/2 and YC3/4. The following season trenches were laid 5m south of the reference peg and near the southeast wall of the Periya Muniyandi temple, guided a grid layout. Trenches XA1 and XB1 were set 20m west, with parallel southern pegs and white thread marked 50cm buffers inside and out, leaving a 9m x 9m dig area split into four 4m x 4m sections by 1m central baulk area.

Stratigraphy

Keeladi

The excavation at the quadrant YD4/2 was taken as a key trench from Locality- I to understand the stratigraphy of the archaeological mound as it was undisturbed with promising consecutive dating from subsequent layer (Fig. 5.8). From the surface level methodically being carried out with sequential accumulation of deposit in consecutive layers right from the humus and the lower level sequentially is till the natural soil. As the depth of this quadrant reached 443cm, having given fine trimming of all the sections of the quadrant, the distinctiveness of the stratified deposit by colour content and texture becomes so legible. On this basis, stratigraphy of this quadrant consists of humus, layers 1 to 6 and the virgin soil, as a natural deposit at the lowest depth of 405 to 443cm.

Humus

This consist of fibrous, root mixed semi compact clay deposit running in all the directions ranging in thickness 5cm and 18cm as minimum and maximum traced at west and eastern sections. At its lower level where in it merges with the

stratum 1, few pieces of brick bats besides potsherds on the eastern section of the northeastern corner of the quadrant. At this level from a depth of 11cm an amethyst bead was recovered and the same corresponding to such occurrence of same variety from other quadrants of the locality. Ceramic types of this deposit mainly comprised of medium red slipped ware, coarsened ware besides, medium and coarse variety of black-and-red ware and black ware. Some other potsherds contain decorations and designs particularly red slipped ware and red ware. The depression spotted near the northeastern corner of the quadrant seems to be some kind of dump.

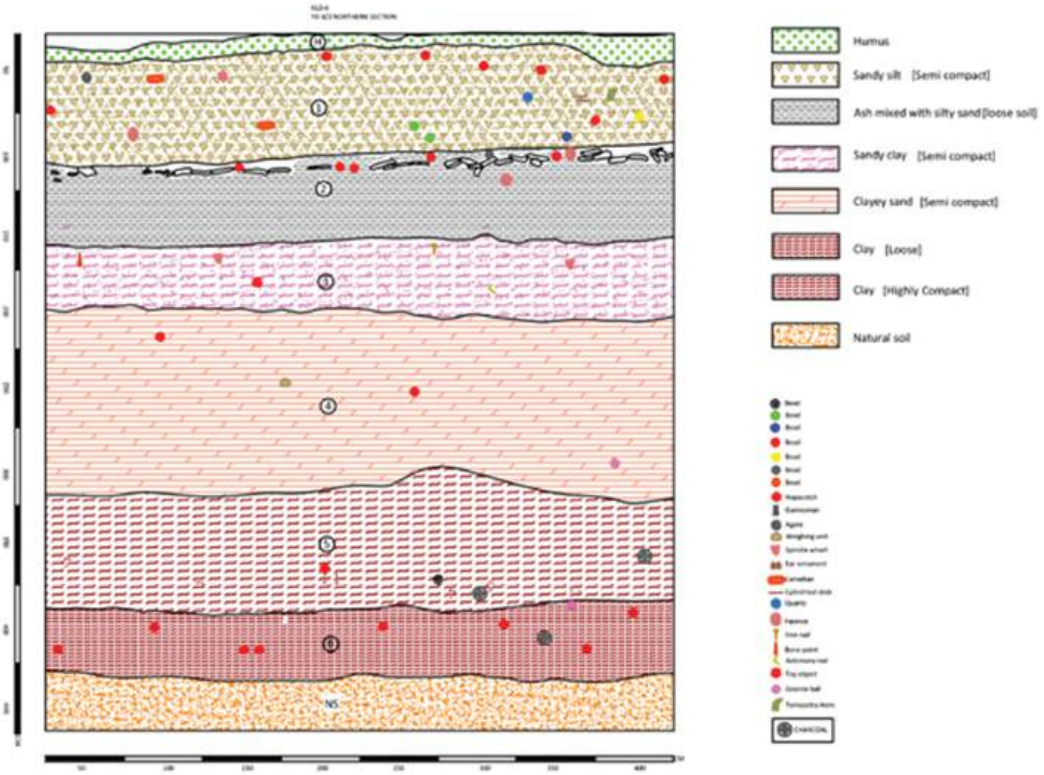

Fig. 5.8 Keeladi: Northern Section wall of excavated quadrant YD4/2

Layer-1

It is semi compact ashy grey deposit running uniformly in all the section with minimum thickness spotted at the centre of the eastern and western section 32cm while the maximum thickness traced at the northwestern corner and middle of the northern section quadrant measured 63cm. It does not have much disturbance except few brickbats found attached to southern and western section. At this corresponding level depth ranging between 10cm and 68cm antiquities like crystal quartz bead, carnelian bead, banded agate bead, unidentified copper objects, hopscotches, faience beads, etc besides the emergence of medium and

coarse variety of red slipped ware, red ware besides appearance of medium fabric of black-and-red ware and black ware noticed.

Layer-2

This layer succeeds layer one from a depth of 75cm and reaches a depth of 150cm. the deposit is of reddish-brown sand mixed clay textured. Some portions of eastern section, entire northern section and to a length of 50cm to the western section revealed a purposeful spread of evenly spread roof tiles as a course of pavement and the same has maximum thickness of 15cm. Similar structural activity was noticed in YD5/3, YD4/1. During the 5th season such roof tile paved water passages were exposed from YD6. The spread of such constructional activity very well confirms the contemporary level of building activity along with wall chamber like construction of the locality. But for this feature the entire layer runs in all the sections without much disturbance except the middle of the southern section to a width of 45cm to a height of 57cm. it consists of rammed clay turned terracotta like material due to constant firing activity. it could be recognized as a portion of furnace-like activity meant for some kind of cottage industrial purpose. The colour of the deposit is reddish yellowish brown, continuous potsherds, brickbats, charcoal mixed deposit at some portion. Its minimum thickness could be traced in the northwestern corner of 43cm while the maximum noticed at the centre of the eastern section of 70cm. It is semi compact in nature with the mixture of sand and clay. This layer yielded antiquities like weighing stone, faience beads, unidentified copper and iron objects, bone bead and hopscotches.

Layer-3

This layer although resembles to be of the upper level but with its sand content differs with an ashy brown colour of the top being followed a thin patch of reddish-brown clay, sand mixed deposit and at the lower comparatively thicker band of dark reddish brown clay mixed deposit constituting as one sequential deposit accumulated consecutively. Although such feature exists in all the sections, they were missing or merged with the upper level of this layer and tensed to be the same deposit. The entire width, different colour, content and texture treated as one single unit of stratigraphy probably denoting consecutive accumulation of different kind of materials with colour change curved out by the contemporary as a single sequence. Its maximum thickness of 35cm was noticed at the middle of the western section and maximum thickness of 62cm was spotted near the northeastern corner of the eastern section. At this level antiquities like

unidentified copper and iron objects, weighing stone, bone point, spindle whorl, etc. recovered. Apart from them change of ceramic type from medium coarse to fine variety started appearing. Approximately layer appeared from the depth of 130cm to a depth of 190cm.

Layer-4

This deposit is semi- compact in nature with much sand mixed in its content and it appears from a depth of 180cm to the deepest point of 280cm. This layer also contains same kind of intervening additions in the form of thin patch of charcoal mixed content, comparatively thicker patch of reddish-brown clay mixed deposit at the middle and lower level of the layer respectively. In fact these kinds of patches do exist to some length of the eastern and western sections besides the entire stretch of the southern section. On the other side particularly of the north section, a reddish-brown patch of deposit and middle of the layer with its projective and extending to 50cm of eastern section and approximately 1m of western section. It contains a greater number of potsherds and the sections particular western, northern and eastern some portions of the southern revealed such accumulation of potsherds found embedded in a loosely filled deposit. This stratum yielded Tamili inscribed potsherd with Tamil letter alongside few graffiti potsherds. This deposit also yielded antiquities like unidentified iron and copper objects, weighing unit, fishbone bead, unidentified shell objects, etc. Its minimum thickness inclusive of the reddish-brown patch and the charcoal mixed patch noticed. Its minimum thickness of 40cm was noticed near the south eastern corner of the southern section. Its maximum thickness of 1m is noticed at the middle of the western section. Hither to the intervening activity in the form of firing spread of reddish-brown clay mixed deposit has patches suggestive of some kind of habitation cum structural activity existed.

Layer-5

This layer is revealed from a depth of 275cm below surface level to the maximum depth of 340cm. This is comparatively compact than the upper layer and the southern portion revealed some kind of building activity in two courses of rammed floor-like pavement, one above the other to a thickness of more than 30cm. But for it, the same kind of deposit with colour, content and texture exists in all the sections and runs uniformly. Near the north-eastern corner, repetitive deposit of 1m patches of charcoal within this layer indicates consecutive, continuous, firing activity and such a deposit as accumulated patches with intervening patches

of ashy pale brown deposit. During this depth, antiquities such as stone ball, unidentified copper and iron objects, hopscotches were recovered and finer and medium fabric of ceramic types like black-and-red ware, black ware, red slipped ware and coarse red ware noticed and a greater number of graffiti-marked potsherds were collected from this layer.

Layer-6

This appeared from the depth of 325cm and extended to the farthest point of 405cm, 170cm north of the eastern section from the south-eastern corner of the quadrant. It is comparatively compact and yielded a lesser number of potsherds. Initially more numbers of pottery were at the upper level and got reduced as if reached the lower level. Here too occurrence of graffiti-marked potsherds in a considerable number were collected and charcoal samples were collected for scientific analysis. This layer is somewhat sterile, at the lower level confirms the appearance of the natural soil of the locality.

Natural Soil

The appearance of natural soil traced at 405cm depth and the same to set confirmed digging to a further depth of 443cm. Based on the perfect cutting of the sections this quadrant revealed the stratigraphy in a more, clear distinct manner right from humus with succeeding layers 1 to 6 found accumulated once the natural soil of river sand mixed deposit, reddish in colour completely devoid of manmade object occurs.

Kondagai

The entire area around the site is a quaternary alluvial plain, formed by the Vaigai river and its creeks through the process of fluvial action. Over time, highland rocks were eroded, carried by running water and deposited in the lowlands, creating this alluvial plain. The sediments here were mainly laid down by physical weathering, but factors like climate, groundwater changes, parent rock composition and landforms also triggered chemical weathering. Exposed gneissic rock at the site and nearby areas suggests the bedrock was uplifted or its top layer was worn away by weathering. Unlike Keeladi and Agaram, Kondagai features a unique stratigraphy with physio-chemically weathered sediments, including clayey silt, silty sand, ferricrete and calcrete.

The stratigraphy of trench begins with a humus layer at the top, which shows repeated filling across three depositional courses. The northern section starts with

a light yellowish-brown sandy layer, transitioning downward into a pale greyish, fine-grained sandy clay, especially noticeable in the northwest corner. Beneath the humus lies a reddish-brown sand-mixed deposit, varying in thickness from 3cm to 18cm. The humus layer itself ranges from 2cm in the west to 32cm in the north. The layer below consists of coarse sand mixed with pebbles and small rubble, forming a compact, naturally occurring ferricrete deposit. This layer is consistent across all sections, with its thickest point exceeding 40cm in the middle of the northern and western sections. Interestingly, from the level of Layer 1 two circular white patches appear in the middle of northern half persisting deeper into the next layer.

Under the ferricrete, a harder, more compact calcrete layer emerges, starting at approximately 60cm deep and sloping gradually southward. This deposit was semi-compact and reddish-brown, spans across all sections of the excavated trenches and its shallow depression was filled with calcrete beneath the humus. The ferricrete layer, packed with gravels, small pebbles, rubble and large sand grains, spreads throughout the trench. The calcrete layer appears just below ferricrete, notably spreading all around the excavated area. In trenches like O7, where urns are buried and filled with calcrete. However, urns and burials from the last season, north of the Kondagai-Pottapalayam road near the village veterinary hospital, align with the ferricrete level, consistently filled with similar materials.

Agaram

The sequential stratigraphy of the quadrant B1/3 taken as the key trench for the site Agaram and from the surface level till the depth of 500cm revealed the stratigraphy consisting of humus on top, running in all directions with slight inundations, followed by layer 1, 2, 3, 4 and 5 overlying natural deposition (Fig. 5.9). There are not much disturbances found in this quadrant when comparatively observed with other exposed quadrants. The working pit of a probable ring-well is observed at the centre of northern section in this quadrant. Besides extensive dump activities were present on the eastern and partially on the western section.

Humus

The exposed stratigraphy consists of humus of recently added excavated deposit besides the deposit with loose powdery, fibrous texture, grey in colour ranging in thickness between 8cm and 22cm. At this level tree roots observed to have penetrated in the western section.

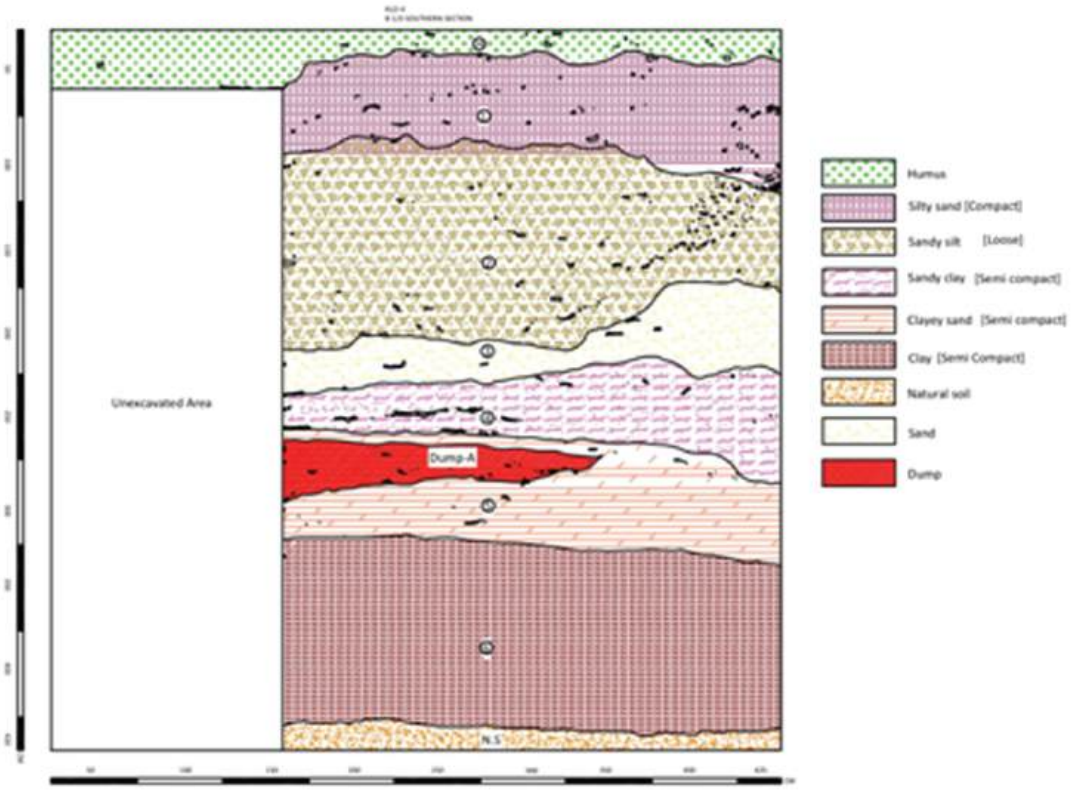

Fig. 5.9 Agaram: Eastern Section wall of excavated quadrant B1/3

Layer-1

The layer transformation from humus to layer-1 was observed to change from greyish sandy silt to pale greyish colour comprised of sandy silt of moderately compact texture. The lower portion of this part resembles some kind of shallow dumping of potteries and brick bats with charcoal mixed deposit here and there. In the south-eastern corner of the quadrant, a large sized worked boulder was found embedded in the section and it was partly exposed.

Layer-2

The layer transformation from layer-1 to layer-2 was observed to have the colour of the sediment was observed to be greyish silt with a yellow tinge of sandy clay deposit and comparitively compact than layer-1. At a depth of 95cm occurrence of a lime patch was noticed near the north-eastern corner and middle of the southern section. As a result, shallow pick was applied to trace the continuity of the same throughout. To the expectation the spread of lime has heaped deposit observed at the northeast corner as well as the middle of the southern section, besides a thin curvilinear line of 1- 1. 5 inch thickness passing through the middle

of the quadrant as well as a thin deposit of the same, noticed in the northwestern corner to around 1m length of the western section and its eastern extension up to 20cm.

Dump-A

A shallow dump was traced at the bottom of layer-2. The dump is found sealed by layer-2 and cutting slight portions of layer-3 at the upper level. It is composed of ashy deposed of loose silt and dark greyish in colour. The thickness of the dump is observed to be 10cm and it stretches on the south and western wall of the quadrant.

Dump-B

Another dump noticed on the north-eastern part of the quadrant. It is slightly thicker than the other dump observed in the southwestern part. However the material found within the dump was observed to be comprised of an ash mixed silty sand deposit of dark grey colour. The thickness of the dump measures over a foot at some portions of its length from the northeastern corner of the quadrant.

Layer-3

Underneath layer-2, the stratigraphic changes in the sediment were noticed with pale brown clayey sand mixed with an ashy deposit which could be traced and a shallow stretch of lime content was noticed just above the pale brown coloured deposit of this stratum on the northern section near the northwestern corner. While in another portion the colour seems to be black tinged greyish colour. Few large sized potsherds probably of a broken pot were noticed emerging out of a deposit 174cm towards the west and 217cm towards the south from the north-eastern corner. The eastern section also contains a thin deposit of the lime stretching from the northeastern corner to almost near the southeastern corner with northeastern part elevated to an upper level.

Layer-4

Beneath the layer-3, the stratum was observed to change into pale yellowish brown colour and comprises clayey sand of moderately compact texture uniformly running on the east, south, west and northern sections. This level yielded some finer varieties of potteries in the course of excavations. The layer is found evenly spread without much porosity.

Layer-5

Further digging in other areas of the quadrant continued step by step and the transformation in strata was noted where the sediment was uniformly spread. It is highly compact clayey deposit of reddish brown colour. The layer is characterized by diminishing quantity of potteries at upper level and ceases to exist at lower level marking. This stratum is observed to be sterile.

Natural Soil

Natural soil was traced beneath 410cm and the excavation continued till 450cm to confirm that the quadrant had reached the virgin soil. The sediment was observed to have riverine sand all over the quadrant. After the tracing the natural deposition over half a metre depth was excavated further to confirm the continuity and spread of the natural deposit all over the quadrant.

Manalur

The stratigraphy of the quadrant XA1/4 consists of humus, layer-1, layer-2 over natural deposit of riverine sand taken up as key trench to understand the stratigraphy of the region (Fig. 5.10).

Humus

It consists of black tinged yellowish brown of partially semi-compact sand mixed clay deposit running uniformly in all the directions with a minimum thickness of 6cm noticed near the southwestern corner of the western section and a maximum thickness of 28cm noticed at the middle of the southern section of the quadrant. It revealed roots of thorny bushes as well as fibrous plants at the same position of the surface level. Roughly hewed stone pieces, potsherds noticed. The black tinge of this stratum is mainly due to recent firing activity in a limited way.

Layer-1

This deposit is almost compact in nature with reddish brown cum ashy grey deposit containing potsherds, brickbats on the section of the quadrant. This layer was traced at an average depth of 8cm. Its minimum thickness is of 66cm, located at the southeastern corner of the southern section of the quadrant while the maximum thickness of 100cm this layer deposit was traced 50cm south of the eastern section from the northeastern corner. After trimming, a section was revealed and evenly spread a fine finished surface-like deposit to constitute. This layer is distinctly visible from humus to layer-2.

Layer-2

This is comparatively loose with semi-compact deposit consisting of coarser sand grains mixed with clay. The colour of the deposit is pale yellowish grey and holding brickbats enough potsherds besides a few rubble pieces. The layer was traced at around 90cm depth. Its minimum thickness of 33cm was traced at the northeastern corner of the quadrant. The maximum accumulation of thickness of 65cm was identified at the southeastern corner of the southern section of the quadrant.

Natural Soil

This was traced from a depth of 150cm and found spread in all directions uniformly with coarser grains of sand. Slightly mixed clay at the top and continuing further deeper to a depth of 200cm. On some parts, black patches were noticed maybe due to admixture of carbon particles as accumulation due to water course and got deposited as sediment.

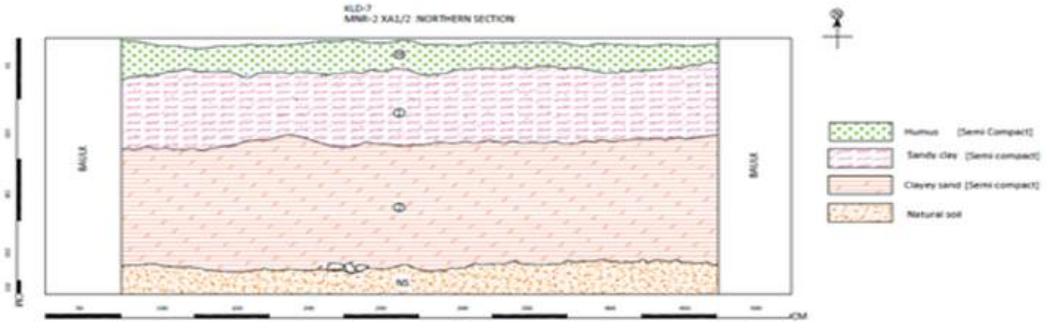

Fig. 5.10 Manalur: Northern Section wall of excavated quadrant XA1/4

Scientific investigations/Documentation

Analysis of bone remains in Keeladi

Bone analysis by Deccan College, Pune revealed that the inhabitants primarily relied on cattle rearing and agriculture. Samples mostly consisted of large and medium-sized animals, including cows, humped bulls (*Bos indicus*), buffaloes (*Bubalus bubalis*), sheep (*Ovisaries*), goats (*Capra hircus*), nilgai (*Boselaphus tragocamelus*), antelopes (*Antelope cervicapra*), wild boar (*Sus scrofa*) and peacocks (*Pavo cristatus*) (Fig. 5.11). Cattle, specifically humped bulls, cows and buffaloes, along with goats, comprised 53% of the bone samples, with cattle bones being particularly prevalent. This substantial evidence indicates a society deeply involved in animal husbandry. The presence of cut marks on deer, goat and wild

pig bones confirms that the community consumed these animals, even though deer (6.66%) and wild boar (1.33%) were less common in the area. Ultimately, the findings highlight agriculture and cattle rearing as the essential occupations of these people.

Fig. 5.11 Keeladi: Bos Indicus disinterred in the excavations

Petrographic Analysis

The Petrographic investigation on ceramics particularly on black-and-red ware, red slipped ware and coarse red ware carried out at Keeladi in collaboration with Vellore Institute of Technology, Chennai and University of Pisa, Italy to obtain a full characterization of the ceramics by optical microscope (OM), compositional characterization by X- Ray Diffraction (XRD) and X-Ray Fluorescence (XRF) and Raman Spectroscopy on decorated surfaces provided an excellent picture about the nature and production technology of the Keeladi ceramics (Fig. 5.12). Petrographic analysis of pottery from the Keeladi shows the prevalent presence of black-and-red ware, offers significant insights into ancient craftsmanship and trade. A large number of vessels, including small pots, bowls, vases and dishes of varying shapes and sizes, were unearthed. Spectroscopic analysis of black-and-red ware, revealed that hematite (an iron ore component) was used for the red colour and carbon for the black, over the inverted firing technique where oxidized firing to produce red colour and reduction firing to get black colour. This indicates the ancient potters of Keeladi possessed sophisticated technical knowledge,

capable of producing this distinct ware by achieving temperatures up to 1100˚C. This consistent technique and material use for earthen vessels by the Sangam Age people of Keeladi spanned from the 6th century BCE to the 2nd century BCE.

Furthermore, some pottery samples contained earth content similar to that found in other regions, suggesting goods exchange with neighbouring areas, likely facilitated by traders, craftspeople or visitors. The mineralogical assemblage of both black-and-red ware and coarse red ware from Keeladi aligns with local geological outcrops, specifically pyroxene granulites and charnockite gneiss, which helps characterize common pottery production in Tamil Nadu. Textural differences between the two ceramic types, such as the finer black-and-red ware for table bowls and coarser red ware for storage jars, likely reflect their distinct functions. The mineralogical composition also points to the use of non-calcareous illite clays and intermediate rock fragments, consistent with local clay geochemistry (Odelli et al., 2020).

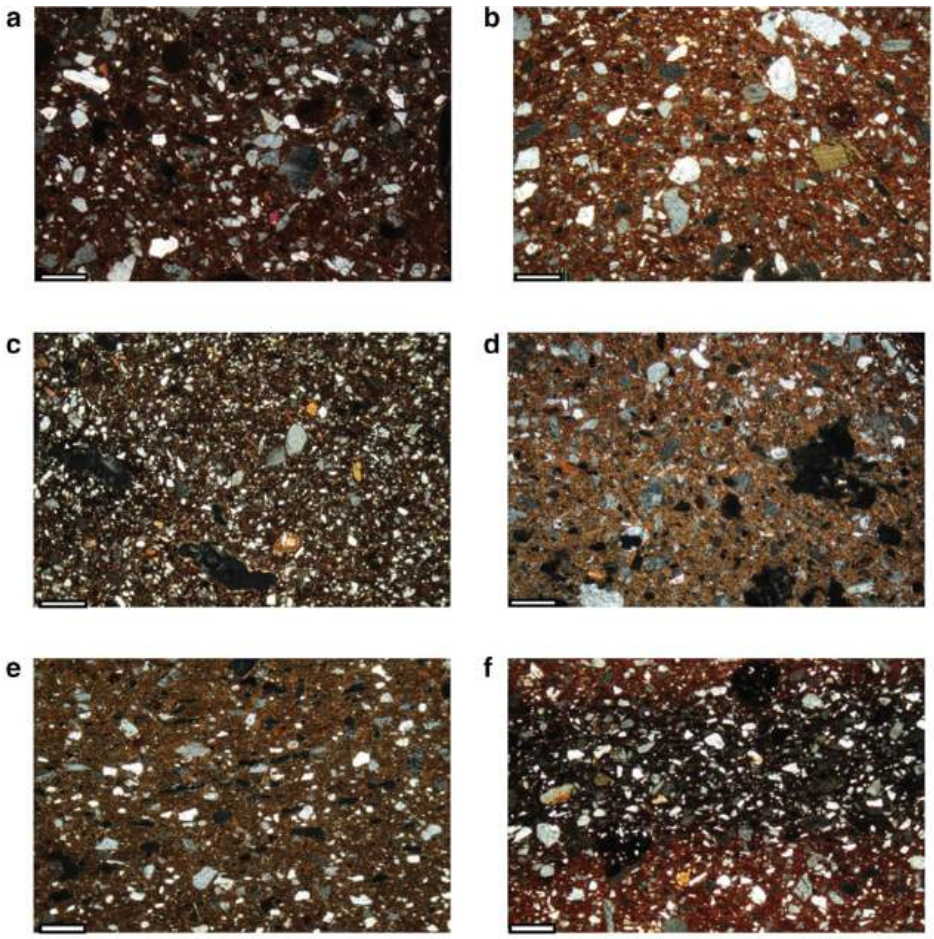

Fig. 5.12 Keeladi: Microphotographs of samples from Keeladi representative of the two identified fabrics. Fabric KLD-1: a K5, b K1; Fabric KLD-2: c K3 d K9; Fabric KLD-3: e K2, and Fabric KLD-4: f K16. Scale bar: 500 µm (Odelli et.al. 2020)

Nano-Technology

The existence of the lustrous black in black-and-red ware for several years, irrespective of them buried for centuries underneath, is an interesting technological investigation for archaeologists. The studies carried out by the Science Branch of the Archaeological Survey of India and Vellore Institute of Technology, Chennai revealed the presence of single-walled carbon nanotubes, multi-walled carbon nanotubes and layered sheets in the coating of the black-and-red ware (Fig. 5.13). Interestingly, these nanomaterials were prepared in the 6th century BCE and have remained stable till now. The discovery of Carbon Nano Tubes (CNT) in the Keeladi shards is the oldest among the nanostructure recognized till now from the ancient artefacts reported elsewhere in the world.

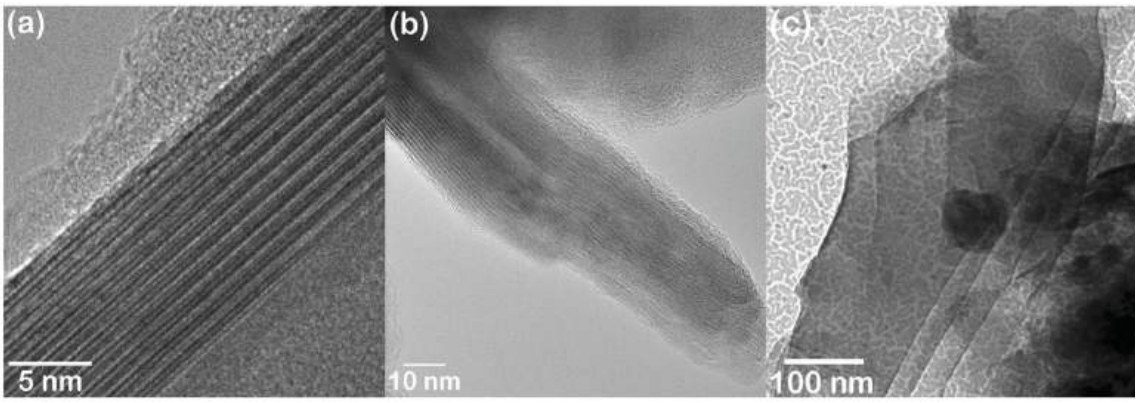

Fig. 5.13 (a) SWCNT bundles observed from the coating (smaller spacing is the separation between two walls and larger spacing is the tube inner diameter) (b) MWCNT with curling and damages and (c) Stack of grapheme oxide sheets

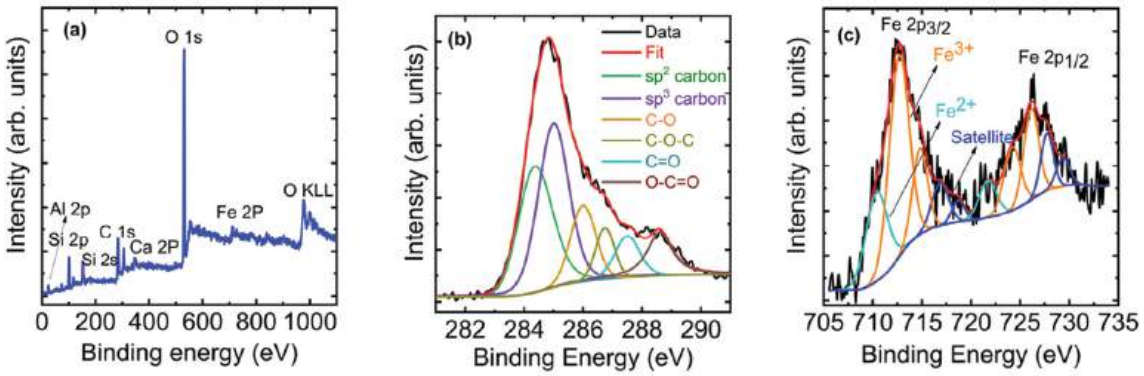

Fig. 5.14 Keeladi: XPS spectrum of the black coating. (a) Survey scan showing the presence of various elements, (b) Deconvoluted high resolution C1s XPS spectrum, (c) Deconvoluted high resolution Fe 2p XPS spectrum. The ration of Fe 2p3/2/Fe2p1/2 is 1.97 which is very close to theoretical estimates as 2.

Pollen and Phytolith Analysis

The studies on pollen and phytoliths by French Institute of Pondicherry, Birbal Sahini Institute of Palaeosciences, Lucknow and Deccan College, Pune provided the culinary habits, agricultural practices, domesticated animals, crops, wild animals and the environs prevailed in the Sangam Age. The Gas Chromatography and Mass Spectrometry (GC-MS) analysis of organic residues preserved in the inner surface of the potteries revealed the presence of various informative organic residues clearly indicating their nature of food consumption. Among the species, the cattle predominate in the scene with 25%. If we, put the ox, cow, buffalo and goat together, it occupies almost 53%, thereby indicating that they were predominantly agricultural communities. The presence of antelope to a level of 6.66% and wild boar (1.33%) suggests that they were hardly domesticated. The availability of cut marks in some of the animals like antelope, goat and wild boar suggests that they consumed goat, boar and antelope. Pollen and phytolith analysis at Keeladi by the French Institute, Pondicherry has provided crucial insights into the ancient environment and flora. The findings indicate the presence of palm trees, *Poaceae* grasses, sedges (*Cyperaceae*) and various dicotyledonous plants. The abundance of Cyperus grass, in particular, suggests that this specific type of sedge thrived in the ancient environment of Keeladi. This botanical evidence helps reconstruct the local ecosystem and potentially offers clues about land use or climate conditions during the period of occupation.

Diatom Studies

The diatom studies carried out in collaboration with the Agarkar Research Institute, Pune suggest that diatom taxa with an affinity to the terrestrial or semi-terrestrial environment were the most abundant and dominated the population (Fig. 5.15). As these habitats are subjected to prolonged dry periods, the taxa residing here are most likely desiccation-tolerant species. The samples collected around the ring well suggesting abundant water usage. The pollution tolerant diatoms such as *Nitzschia, Hantzschia, Craticula subminuscula,* etc. signify that people have extensively used these wells for various human-related activities. Diatom analysis of terracotta ring-wells indicates that the region was historically a dry and drought-prone area. The discovery of fossil diatoms such as *Hantzschia, Luticola, Pinnularia* and *Nupela* within these wells is significant because these specific genera are known for their tolerance to environmental stressors, including pollution. Their ability to thrive suggests that the ring-wells experienced some level of pollution, likely stemming from various human activities within the settlement.

Fig. 5.15 Keeladi: (a) Hantzschia, (b) Luticola, (c) Pinnularia and (d) Nupela

Residue Analysis

Analysis of organic residues from grave goods at Kondagai, conducted by the Department of Genetics at Madurai Kamaraj University using Gas Chromatography-Mass Spectrometry (GC-MS) / MS, has provided significant insights into ancient food practices. The preliminary study on the organic residue analysis of archaeological potteries gave a comprehensive insight into the cultural and agricultural practices of the ancient south Indian population. These results contribute to a better understanding of the utilization of potteries and gave a glimpse of the dietary pattern and cultural practices. The preserved organic residues, extracted from scrapes associated with the inner surface of potteries were analyzed by Gas Chromatography-Mass Spectrometry (GC-MS). Traces of cholesterol indicating the processing of animal fat and fatty acids indicating the usage of plant and dairy-related products were observed.

The study identified a wide array of plant-based ingredients in use, including turmeric, coriander, ginger, garlic, cumin, tamarind, bottle gourd, bitter gourd, moringa, neem, various greens, banana, *jujube,* custard apple and pomegranate. Additionally, evidence suggests the use of groundnut oil, coconut oil and palm oil. Key food items identified were rice, black gram, millets (such as *thinai* and *cholam*), milk and butter. Notably, numerous date-fruits were discovered in the pots and paddy grains were specifically found in burial urns excavated at Kondagai, further enriching our understanding of their dietary staples.

Metallurgical Analysis of Iron Objects from Keeladi

Metallurgical analysis of iron artefacts recovered from Keeladi by VIT and IIT, Gandhinagar provides compelling evidence of advanced iron-working techniques that align with descriptions found in Sangam literature. The process employed to produce these implements, known as wrought iron, involved several key steps: initially, carbon particles were removed from iron ores by melting them in a bellowed furnace. Subsequently, the remaining slag was expelled through hammering and the material was then cooled into rounded ingots. These ingots were further heated and repeatedly hammered to achieve the desired shapes for

various tools and implements. The iron ores utilized in this ancient metallurgy were a complex mixture of minerals, predominantly iron and silica, but also containing aluminium, phosphorus, calcium, potassium and carbon. A detailed elemental breakdown of the iron objects from the preliminary study lists sixteen different elements found in the analyzed iron artefacts, along with their respective weight percentages (Fig. 5.16). Iron constitutes the vast majority at 79.80%, followed by significant amounts of Silica (16.50%) and smaller but notable percentages of Aluminium (2.35%) and Phosphorus (2.28%), among others. A key finding from this analysis is the remarkable corrosion resistance of these 2600-year-old iron artefacts. This longevity is primarily attributed to the substantial presence of silica and phosphorus in the iron mixture, which are known to inhibit rust formation. However, the combination of high silica and carbon content, while contributing to rust resistance, also rendered the iron objects more rigid and somewhat brittle. This intricate understanding of material properties and their manipulation underscores the sophisticated metallurgical knowledge possessed by the ancient artisans of Keeladi.

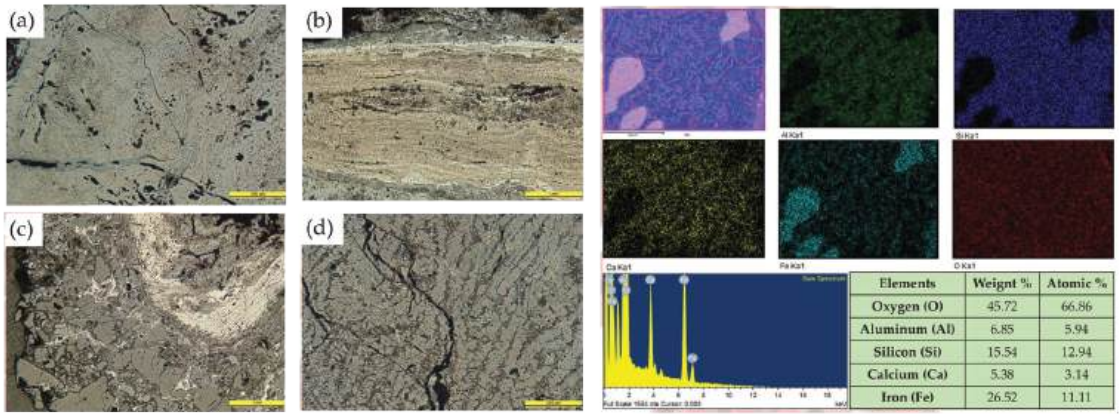

Fig. 5.16 Keeladi: (a) Optical Microscopy Analysis of Iron Artefacts; and (b) EDS analysis of Sample from Keeladi

Significant findings

Throughout the progress of excavations at Keeladi each year the site goes to reveal a significant finding. In the fourth season of excavation at Keeladi, two terracotta ring-wells where one found at lower levels built uniquely from all the other disinterred ring-wells with thicker walls and a brick wall was found isolated. It is in this season where the antiquity of Tamili script was pushed back to 6th century BCE by AMS dating with contextual analysis. In the 5th season excavation a curvilinear brick channel and a long wall were found aside from terracotta ring-wells. Dual terracotta pipes found placed one over the other and the bottom

pipe found connected to a container. The continuity of structure discovered by ASI were also traced during this season. In the sixth phase of excavations, additional structures were traced. Significantly one of the deepest ring-well ever found in Tamil Nadu through excavations were found during this phase. During this phase multiple AMS dates as irrefutable support to the former claim of antiquity of Tamili script was also added to its significance. In the seventh phase of excavations, a decorated terracotta ring-well with coir and thumb pressed patterns topped by fish symbol incised over the first ring of this well. Aside from that multiple storage containers were found at lower levels. In the eighth phases of excavations the digging concentrated on the southern part of the mound goes to reveal isolated structures and terracotta ring-wells. In the ninth phase of excavations, a heavily rammed floor made of clay and mortar was found and when the floor was cut a 1. 5m thick deposit of pottery dump expanding to 30m north-south and 20m east-west. Within this dump thicker fabric and multiple forms and different sizes potsherds of various typologies including red ware, red slipped ware, black-and-red ware and black ware with some bearing graffiti marks were found. In the tenth phase of excavations the western fringe of the mound was excavated. During this current and latest phase residential area were found with presence of semi-circular post-holes hinting a presence of similarly shaped hut / roof over it. In this region multiple storage containers were found in close proximity to one another in multiple stratified levels. The terracotta pipe in barrel shape was also found in this part. In one of the rammed mud floor level, post-holes were found rightly cut showcasing this floor once had a roof that is now degenerated. Aside from these many archaeological features, the retrieval of over 13000 artefacts distributed through the excavated area help in understanding the material culture that once prevailed in the region which is discussed below.

Graffiti and Tamili inscribed potsherds

The foremost significant find in Keeladi is the Tamili inscribed potteries which includes names like *laman, (mā)tāaiyvilaita(), kuviraṉāta[ṉ]. [kā.kuvi..], atā., ma parā/ a. []tiy / atā, [cā]tta[ṉ], tit, []kara[ṇa][.]ṇata[lara], ātaṉ., [.] kōtiramaara[] [.]kara[ṇa][.]ṇata[lara]* and *taṉata..(pa) taṉēsiṟikatiraṉ ā(pa)* (Fig. 5.17). These inscriptions show that the common people were literate enough to write their names hinted not merely by the presence of different names but also by unique handwritings. The major portion engraved on ceramics belongs to red ware/coarse red ware (13%), red slipped ware (27%), black-and-red ware (53%), black ware (3%), russet coated painted ware (3%), white painted ware (0.05%) and rouletted-ware (0.05%). All of them were post-firing in nature and mostly

engraved on the shoulder portion of the pots making them readable and visible. In total, 2128 graffiti-bearing and 172 Tamili inscribed potsherds were collected and documented. There are also enough numbers of graffiti sherds of both pre and post-firing nature with latter variety in dominant quantity (Fig. 5.18). In this context, the recovery of graffiti sherds from Keeladi excavation recalls the preliminary writing expressions of the early people. Symbols like fish, ladder, sun, spider, bow, arrow, plant, etc. besides geometric and non-geometric abstract symbols were also found amongst these graffiti

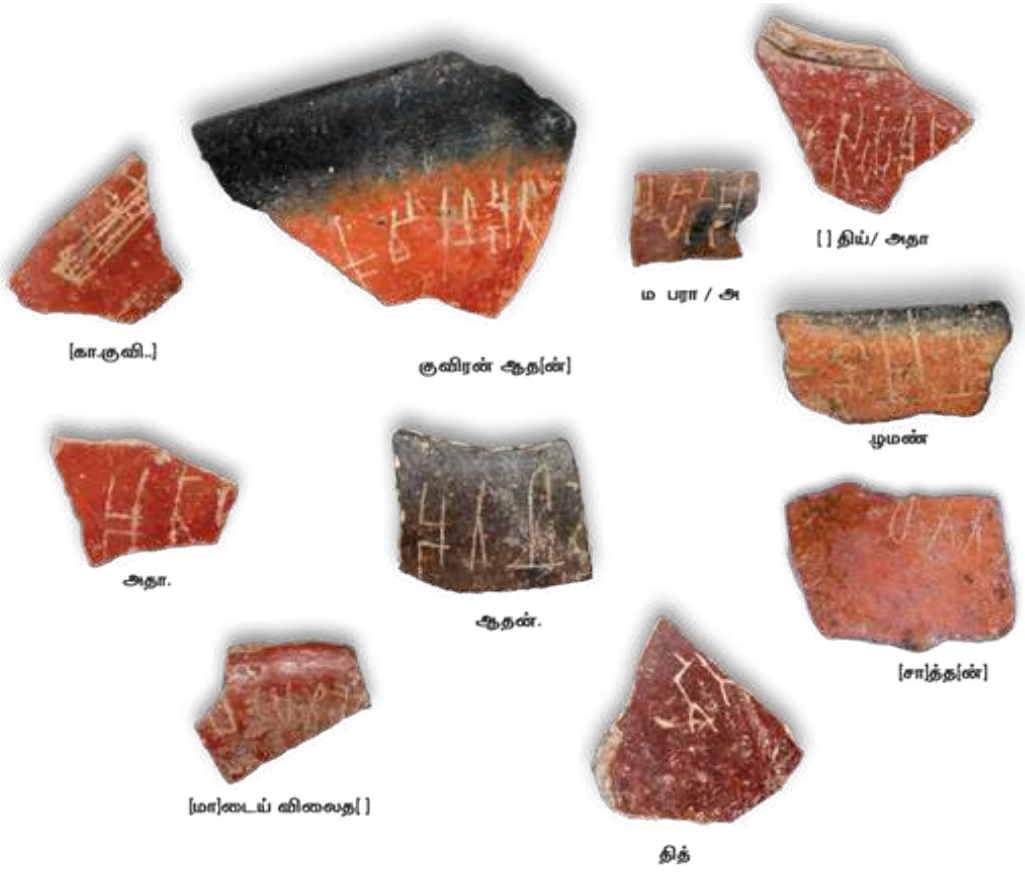

Fig. 5.17 Keeladi: Tamili inscribed potsherds from the excavations

Fig. 5.18 Keeladi: Graffiti marked potsherds from the excavations

Structural Remains at Keeladi

The structural remains at Keeladi represent a significant discovery, being one of the most extensive, continuous, non-residential and non-religious complexes ever uncovered in Tamil Nadu (Fig. 5.19). Across multiple seasons of excavation, this unique structural complex has consistently revealed an intriguing industrial nature showcase the structural engineering of early historic people. The XRD, Spectroscopic, Thermogravimetric (TGA-DSC), XRF, FT-IR (Fourier transformation infrared spectroscopy), Field Emission Scanning Electron Microscopy (FESEM-EDX) analysis were carried on bricks, lime plasters, ring wells and roofing tiles to understand various physical properties such as hardness, water absorption, crushing strength, colour, soundness and efflorescence of Keeladi structural remains by Vellore Institute of Technology, Chennai and Sivasubramanyia Nadar College of Engineering, Indian Institute of Technology, Gandhinagar. The spectroscopic analysis of Keeladi pottery samples reveals the advanced technological expertise of ancient potters. Firing temperatures between 600º C and 900º C indicate sophisticated kiln construction and operation, allowing for a controlled atmosphere at consistently high temperatures, which is crucial for producing pottery with varied finishes and strengths. The presence of specific mineral transformations and the ability to manage both oxidizing and reducing atmospheres demonstrate a level of control. The incorporation of organic materials has served dual purposes, improving workability during shaping and enhancing the overall strength of the fired pottery. The analysis suggests stable transformation patterns in minerals such as quartz, calcite, hematite and magnetite. The presence of glazing surfaces in some samples suggests the possibility of using organic substances as protective layers, providing valuable insights into the technological achievements of the ancient people, showcasing a high degree of ceramic knowledge and craftsmanship that rivals contemporaneous cultures.

Following the discovery by ASI, the structural extent was disinterred to the south by TNSDA. Initially in the quadrant YP7/2 yielded an isolated wall, in east-west brick alignment at 125cm deep, with bricks measuring 35-36x23-24cm, matching earlier finds and suggesting a standardized living standard across the mound. Additional brick courses with a northeast extension, while ruined brick pieces were embedded above and a lower course with a southward offset featured seven rectangular-shaped bricks extending to the northeast corner. Ring-wells in A1/2 measured 93cm diameter, 202cm high and A3/2 measured 215cm high, 410-625cm deep showcased interlocking terracotta designs, with the latter surrounded by compact clay and alluvial sand.

Fig. 5.19 Keeladi: Brick structural complex of industrial nature unearthed in the excavations showing multiple channels, tanks, terracotta ring-wells, terracotta pipes, hearth, storage containers, where the channels oriented from south to north

Excavations also revealed scattered, brick structures across the mound, with collapsed roofing tiles and broken pottery, indicating structures lacked full habitable space indicating it is not residential but rather industrial in nature. A curvilinear channel in quadrants XY9/1, XY9/4, XZ9/2 and XZ9/3, measuring 810-860cm and built with 40x24x6cm bricks (Figs. 5.20-5.21). In quadrants XY7/1, XZ7/3, XZ8/1, XZ8/4 and Z8/3, a long wall oriented diagonally in its entirety measured 1950cm (ignoring the interval caused by later disturbances recorded in-between the long wall) disinterred with 3-6 courses and a 200cm eastern wall (double-row) were exposed, with 120-70cm spacing and damaged bricks (38x23x6cm). The wall extended 665cm across quadrants, with a 250cm gap and continued northeast into XY7/1, where top bricks had toppled due to recent quarrying.

Unique pipe structures were found in YD6, featuring spirals and perforations, with a second pipe in a barrel shape connected to a pot, alongside two north-south oriented open brick channels with hand grooved perforated roof tiles measured 15-20cm deep and post-holes on its sides, showing a slope of tile displacement deeper north and shallower southeast (Fig. 5.22). A brick structure in V7/3 and W7/4 (38x26x6cm, 5-6cm thick) enclosed quartzite pebbles, damaged southeast, measuring 100x80cm. In X8/3, a 110x80cm rectangular brick enclosure with 8 courses, 40x26x6cm bricks with a 60cm high brick floor was found, damaged at the top. Z7/3 revealed a 221cm high terracotta ring-well with 70cm diameter, 2cm wall thickness with seven interlocked rings, damaged by pressure from the top.

Fig. 5.20 Keeladi: Curvilinear brick Channel from the excavations closed on all sides with hollow interior

Fig. 5.21 Keeladi: Long brick wall found in the excavations

Fig. 5.22 Keeladi: Terracotta pipes exposed; spiral type placed above barrel-shaped pipe which is connected to a container

Fig. 5.23 Keeladi: Terracotta Ring-well with a maximum of 37 rings

A circular brick furnace in YD5/1 at 69cm deep measured 73cm diameter, 13cm brick thickness with ashy debris and green glass beads at 112cm. One of the deepest terracotta ring-well ever found in excavations was discovered in the trench YD3 that goes beyond 6m deep with 37 rings (Fig. 5.23). In YD5/3, a broken large vessel measured 46cm diameter and rammed floor with roof tiles were found at 95cm, with deeper digs revealing fragile pottery clusters, a post-hole and bovine skeletal remains (now displayed at the Keeladi museum). YE6/2 and YE6/3 exposed brick walls (36x20-22x6-7cm) with 11 courses at 145cm, linked to the findings of Season 2 by ASI, featuring a southern projection and tub-like structures.

Six ring-wells were uncovered, including YP5/4 at 126cm with a unique fish symbol incised above the embossed coir and thumb pressed pattern and 140cm height across six interlocked rings measured 77cm diameter and YP4/1 at 410cm with 88cm height and dumped potsherds, suggesting past water table changes. In XK13/2, northwest southeast brick structure with a passage for water and post-hole used reworked materials (Fig. 5.24). XM11/2 revealed a 314cm northeast-southwest structure measured 32-34x21x5-6cm with a post-hole and broken vessels, while XM10/2 had a 3-course wall and a 245-371cm deep ring-well measured 63cm top diameter, with 7 rings. A 20m mud floor in XF17 and XF18/4 at 35cm deep, made of clay and lime heavily rammed and measuring 3-6cm thick, overlaid a 3-foot-deep potsherd cluster. These findings illustrate a complex site with varied uses, from water management to industrial activity, spanning centuries.

Fig. 5.24 Keeladi: (a) Ring-Well (b) incised fish symbol

Fig. 5.25 Keeladi: Terracotta Ear Ornaments

Artefacts

In the excavations at Keeladi, antiquities include simple ornamentations namely terracotta ear ornament, bangle fragments made of shell, glasses and copper and micro glass beads (colour: green, red, blue, yellow orange, etc.), antimony rod and lavish ornamentations like semi-precious stone (agate, amethyst, carnelian, quartz) beads and a golden wire, weaving tools such as spindle whorls, bone points and playthings such as dices, gamesmen, wheels and hopscotches (Figs. 5.25-5.41)

Fig. 5.26 Keeladi: Shell Bangle fragments

Fig. 5.27 Keeladi: Terracotta Gamesman

Fig. 5.28 Keeladi: Terracotta Wheel

Fig. 5.29 Keeladi: Terracotta Hopscotch

Fig. 5.30 Keeladi: Bone points

Fig. 5.31 Keeladi: Terracotta Spindle Whorls

Fig. 5.32 Keeladi: Glass beads; colour: orange, yellow, red, black, blue, and green

The most common shape of bead is circular, followed by spherical shape and tubular shape. There are distinct characteristic of shapes like collared, barrel and biconical, etc. A broken touch-stone made of lydite generally used to test gold was also acquired. The presence of metals such as copper, iron, gold and silver lets one peak into the ancient metallurgy knowledge of the people from past. Some of the metal objects are rings and bangles made of copper, iron sickle, iron nails, antimony rod and gold wire.

Fig. 5.33 Keeladi: Copper artefacts

Fig. 5.34 Keeladi: Iron Artefacts

Fig. 5.35 Keeladi: Gold Artefacts

Terracotta figurines of male and female with unique headdress and features, anthropomorphic figures, mould, animal figures were also unearthed in excavations. Apart from these few terracotta seals were also acquired. Miniature toy objects made of terracotta were also unearthed. Weighing units made of dolerite were also unearthed which weigh approximately from 2 to 300 gm. Coins include copper Sangam Pandya coins, silver punch-marked coins, Roman copper coins and medieval copper coins.

Fig. 5. 36 Keeladi: Terracotta figurines

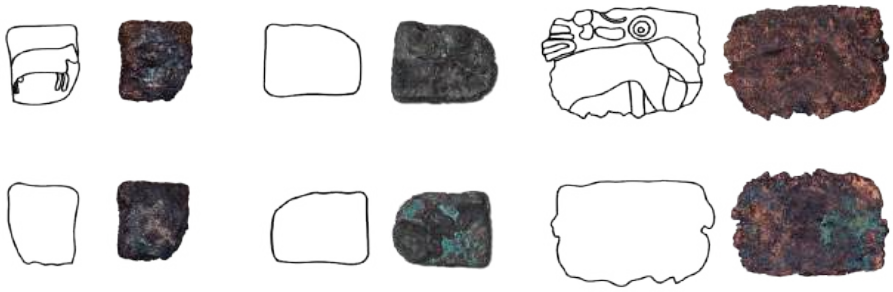

Fig. 5. 37 Keeladi: Sangam Pandya copper Coins

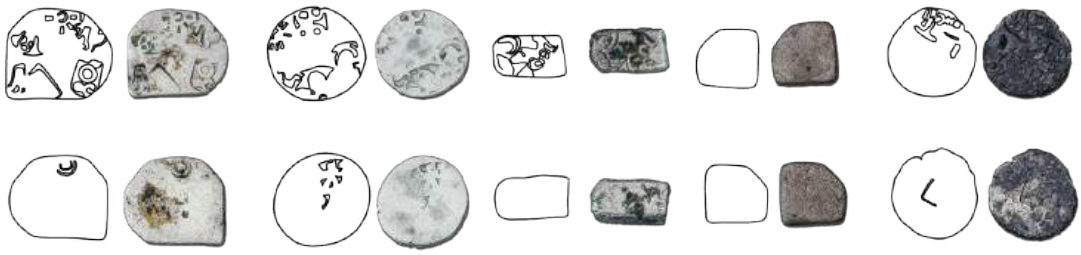

Fig. 5. 38 Keeladi: Silver Punch-marked Coins

Fig. 5. 39 Keeladi: Roman Copper Coins

Dice made of ivory and terracotta 4 in numbers in both cubical and cuboidal shapes have been unearthed in Keeladi excavations. The cubical dices have analogous features such as the shape and markings on the face. Both the dices are cubical in shape and marked with same faces all around with 1 on top and 6 at the bottom; 2 on top with 5 at the bottom and 3 on top with 4 at the bottom. The ivory dice is observed having dotted markings which is encircled by circular incisions. These circles observed to have overlaps over one another like it is stamped over each other.

Fig. 5. 40 Keeladi: Terracotta and Ivory made Dice

A fine specimen of *intaglio* made of carnelian was found in excavations at Keeladi. It is small in size, ellipsoidal in shape and slightly translucent in nature. The base portion of the *intaglio* was white in colour whereas the upper portions are tangerine in colour. This *intaglio* has negative impression of a boar on the face of the object and the boar is portrayed standing..

Fig. 5. 41 Keeladi: Carnelian Intaglio with wild boar incision standing right

A set of 10 different types of beads were disinterred and its three-dimensional location is marked. The quantities range from as low as 2 beads (carnelian) to as high as 1122 beads (glass), indicating a diverse collection. Glass dominates the

proportion, over 65% suggesting a significant prevalence in the archaeological context may have held significant importance in the daily life, trade or cultural practices of the community. Materials like agate, amethyst, carnelian and others have relatively small proportions, suggesting their minor presence in the findings. Faience, quartz, shell, soapstone and terracotta have moderate proportions, indicating a noticeable but not overwhelming presence. The mathematical representation of each material proportion underscores the diverse nature of the archaeological materials reflects the diverse uses and roles of different materials prevailed therein whatsoever. All the beads are distinguished show a trend of glass bead densely occur and quantity domination at upper levels of the strata and gradually diminish and cease to exist at lower levels in the stratigraphy. The same trend was noted in the central part of the archaeological mound as well.

One of the most noteworthy discoveries in the Agaram excavation was the large quantity of microliths relative to other artefacts (Fig. 5.42). Importantly, the microlithic tools were found in a stratigraphical context. Due to the presence of numerous ring-wells and pit activities in close proximity, the microlithic tools became intermingled with artefacts spanning from the Early Historical Period to the late Medieval Period. The lithic assemblage comprises microlithic tools (scrapper, lunate, borer, etc.), various types of flakes (both broken and complete) and cores (unidirectional, multidirectional and bipolar core types). These lithic objects were crafted from diverse raw materials such as chert, quartz, crystal quartz, chalcedony andchertified limestone. Notably, chert was found in a dominant proportion among the utilized raw materials. This detailed account provides insights into the diversity of lithic artefacts, their raw material composition and the temporal context of their occurrence at the Agaram excavation site. The distribution of all artefacts, including microliths, the antiquities found are spread across all excavated quadrants. In an effort to gain a clearer understanding, the focus shifted to isolating and analysing the distribution of microliths. This refined analysis revealed a promising variation in the distribution trend of microliths within the excavation site.

Fig. 5. 42a Keeladi: Microlithics Chert core (unidirectional and multi-directional

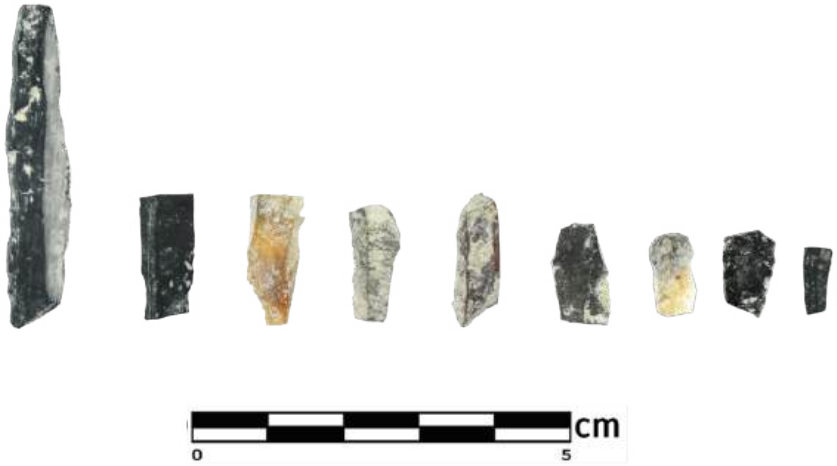

Fig. 5. 42b Keeladi: Microlithics Blade and bladelets

Pottery

In Keeladi excavations, potteries were unearthed in prodigious quantity across the mound invariable of the location (Fig. 5.43). The major potteries that are unearthed in course of excavations are red slipped ware, black-and-red ware, red ware and black slipped ware. Other than these varieties of potteries, the excavated quadrants yielded russet coated painted black-and-red ware, white painted black-and-red ware, perforated potteries, etc. These special character potteries with paints and designs are scarce black slipped ware quantity. It is clearly established while the excavations underway that in proportion, red slipped ware stands out in terms of quantity than any other type of ceramic types occurred at the excavations by huge proportions, followed by the finer varieties of black-and-red ware and red ware. The perforated potteries have small to large perforations clearly indicative of different function of each vessel. The white painted BRW shows dotted decorations, leaf like patterns, linear patterns, etc. Russet coated painted ware also shows decorations on the pottery which are mostly linear patterns.

Fig. 5. 43 Keeladi: Pottery dump of various types

Burials

Among the discoveries at Kondagai excavation,over 150 urn burials and numerous extended burials (Figs. 5.44-5.45). The urn burials contain various cultural and funerary objects. The extended burial

is observed devoid of grave-goods and found only on the western part of the mound in the first two seasons of excavations while it is completely absent in the eastern part of the mound as observed in the following excavation seasons which focused on the eastern part of the mound. Specifically, one of the urns housed 21 grave goods, providing valuable insights into the practices associated with the burials. Additionally, within these urns, iron implements were also identified. This specific category of artefacts exhibited notable diversity, comprising swords, chisel, knife and axe. This diversity in iron implements within the urn burials not only provides archaeological insights into the material culture of the community but also hints at the potential roles these artefacts played in the daily life, craftsmanship and customs of the individuals associated with the burials. This diverse assemblage of artefacts within the burial context suggests a rich cultural and historical significance associated with the site, shedding light on practices associated with the dead highlighting a reverence and respect for the deceased ancestors and the material culture of the community that once inhabited the area.

Fig. 5.44 Kondagai: Burials (a) Urn burials; and (b) Extended burial

Fig. 5.45 Kondagai: Interior view of Urn burial

The excavation yielded distinctive findings, including husk indicative of agricultural activities, a small black slipped ware pot revealing unique pottery styles, burials with one urn placed above another suggesting ritual significance, a red ware urn paired with a black-and-red ware lid showcasing hybrid pottery forms and a remarkable discovery of 74 carnelian beads within a single urn (Figs. 5.46-5.47). These artefacts provide valuable insights into the material culture, burial practices and symbolic elements of the community that once inhabited the site, enriching our understanding of its historical context.

Fig. 5.46 Kondagai: Husk remains found inside urn burials disinterred at Kondagai

Fig. 5.47 Keeladi: Carnelian beads retrieved from urn burials at Kondagai; (a) While retrieving (b) closer view

The prevalence of the red ware type of urn, emerging as the predominant vessel utilized for burial rituals due to its substantial representation within the dataset (Sivanantham et. al. 2023). In close succession, the black-and-red ware type burial urns make their presence felt, although their quantity is notably lower compared to the red ware. Notably intriguing are two instances where a black-and-red ware lid was employed to cover the red ware urn, delineating a distinctive burial pattern. Furthermore, the unearthing of two red slipped ware type urn burials introduces an additional layer of diversity to the spectrum of pottery forms discovered at the Kondagai burial site.

Morphometric and Pathological analysis of Skeletal remains at Kondagai

The skeletal remains procured were all from a primary burial where the body was directly interred in an urn. Besides documenting the skeletal remains, demography, morphometry and pathological observations were made. A total of thirteen individuals whose skeletal remains were found as studied. These included one child, seven middle-aged adults of whom four were male and three were female and three young adults of whom one was male and two were female. Of the remaining two individuals, their gender and age determination, was not possible because of their partial preservation. Although several anomalies are found in the collection, arthritis and dental caries are the common lesions evident in most individuals, a triad of old age (Fig. 5.48). (V. Mushrif-Tripathy et al. 2025).

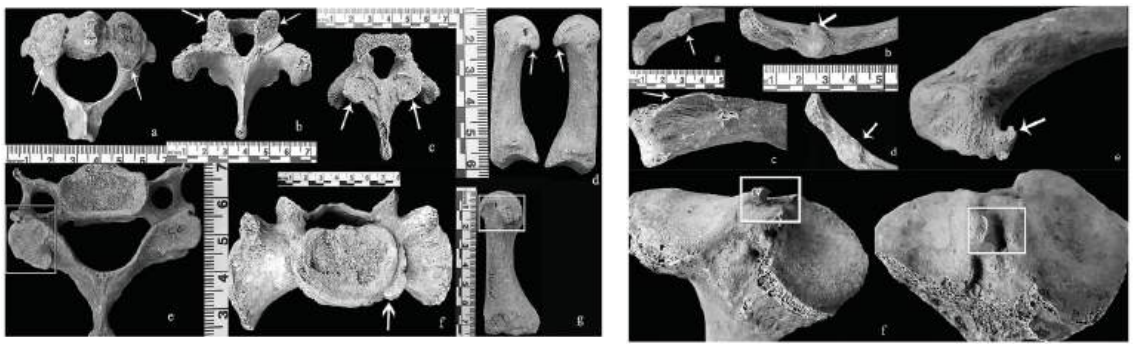

Fig. 5.48 Keeladi: (a) Osteoarthritis lesion on a. Axis (C2) has a slight lipping on the superior articulation facet in the margins; b. Thoracic (individual identification not possible) superior articulation facet margin has lipping and articular facet has porosity/pitting; c. Thoracic (individual identification not possible) inferior articulation facet margin has lipping; d. RL (Right and Left side) 1st metacarpals have a slight bone extension in the distal end on the palmer side; e. Cervical 6 has bone growth/lipping on the L (Left side) superior articular facet; f. The sacral plateau anterior-lateral margin area has a bone extension/lipping, graded – 3; g. L 1st metatarsal has a slight lipping on the distal–medial aspect. (b) a. to e. Ribs having bone extension/lipping on the tubercles and articular facet with vertebrae; f. RL (Right and Left side) tibia medial intercondylar tubercle has a bone extension/lipping and L is more prominent. (V. Mushrif-Tripathy et al. 2025)

aDNA (human)

Analysis of ancient DNA from the human skeletal remains of Kondagai urn burials is conducted by the Department of Genetics, School of Biological Sciences, Madurai Kamaraj University, in collaboration with the Department of Genetics at Harvard University, USA. A dedicated Class 10000 clean lab "Ancient DNA Laboratory" has been established at Madurai Kamaraj University for this work. Potential skeletal samples were screened and DNA was isolated from these samples. Further sequencing of approximately 20 samples, encompassing more than 100 DNA libraries, is in progress. For analyzing the migration pattern in association with a few thousand modern human genomes and about a hundred ancient genomes of South Asia, it is necessary to derive about a lakh of specific DNA markers, SNPs (Single Nucleotide Polymorphism markers) from each sample. Work is in progress to obtain a larger number of DNA markers and to compare them with global reference populations, thereby understanding the routes of migration and the admixture of the ancient inhabitants of Kondagai. The facial reconstruction carried out by Face Lab, John Moores University provided a clue on the morphological features of the people (Fig. 5.49). Analysis of the DNA of ancient animals of Keeladi is also in progress

Fig. 5.49a Keeladi: Skull – Face Reconstruction; Modelling by Face Lab, John Moores University (Courtesy: Department of genetics, Madurai Kamaraj University)

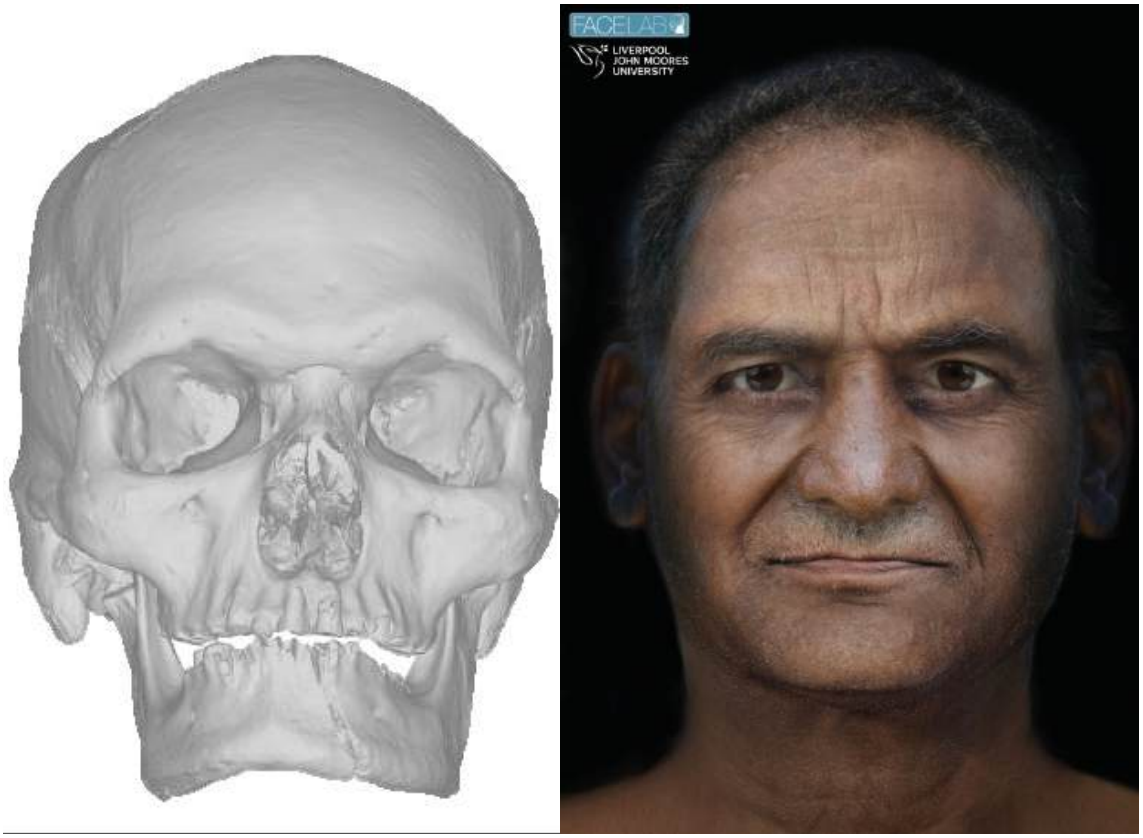

Fig. 5.49 Keeladi: Skull – Face Reconstruction; Modelling by Face Lab, John Moores University (Courtesy: Department of genetics, Madurai Kamaraj University)

The scientific studies underscore the importance of continued research into science and technologies and their role in understanding historical technological developments.Overall, the excavations at Keeladi contributed significantly to our understanding of the ancient urban settlement that flourished along the river Vaigai. These archaeological ventures have unambiguously illuminated various aspects of the civilization, including the literacy of the common man, the antiquity of the Tamili script, the economic activities, social condition, cultural practices, palaeo-environment and technological advancement. The exposed structures, artefacts and ecofacts generated much enthusiasm among scholars, administrators and the general public. The tenth season of archaeological excavations are in progress and it may add further cultural value to the site.

Chronology

The chronological control of any excavated site is so important to place the site in a particular cultural context. For the first time in Tamil Nadu, much importance is given in dating to each cultural phases and sub-phases to understand the transformation. In total, 35 AMS dates were received to date from Keeladi by the Tamil Nadu State Department of Archaeology (see table and Fig. 5.50).

To date, 172 Tamiliinscribed potsherds have been collected and their dates have become crucial in understanding the beginning of writing system in Tamil Nadu. Radiocarbon dating (AMS C14) of samples from Keeladi has revealed a complex timeline of human activity, showing two primary clusters of dates spanning approximately 1800 to 2500 years Before Present (BP) corresponding to the calibrated mid-range value between 220 CE and 610 BCE. While the data is spread across this wide range, most samples are concentrated at depths between 100cm and 400cm, corresponding to a period of roughly 1900 BP to 2500 BP.

S. No	Lab. No	Trench/ Layer/Depth	Material	Conventional Age in BP	Conventional Age	Calibrated Age
1	Beta-583572	YD 3/1/ 520cm	Charred material	1820 ± 30	130 CE	220 CE
2	Beta-583571	YD 3/1/ 400cm	Charred material	1810 ± 30	140 CE	221 CE
3	Beta-583573	YD 3/1/ 575cm	Charred material	1850 ± 30	100 CE	243 CE
4	Beta - 620260	NA	Charred material	1750 ± 30	200 CE	357 CE
5	Beta - 620261	NA	Charred material	2000 ± 30	50 BCE	86 BCE
6	Beta 521460	YF1/1/ 145cm		2090 ± 30	140 BCE	128 BCE
7	Beta - 519481	A3/4/ 347cm (a pit sealed by a layer at 180cm)	Charred material	2140 ± 30	190 BCE	145 BCE
8	Beta 489244	YG4/NW	Charred material	2170 ± 30	220 BCE	192 BCE
9	Beta - 519478	A3/2/ 195cm	Charred material	1770 ± 30	180 BCE	221 BCE
10	Beta - 640442	XM9/3/ 145cm	Charred material	2120 ± 30	170 BCE	223 BCE
11	Beta-759211	YC3/2	Charred material	2210 ± 30	260 BCE	237 BCE
12	Beta - 640441	XM11/2/ 140cm	Charred material	2160 ± 30	210 BCE	241 BCE
13	Beta - 519480	A2/1/ 371cm (a pit sealed by a layer at 200cm)	Charred material	2180 ± 30	230 BCE	264 BCE

S. No	Lab. No	Trench/ Layer/Depth	Material	Conventional Age in BP	Conventional Age	Calibrated Age
14	Beta - 640443	XM10/2/ 168cm	Charred material	2190 ± 30	240 BCE	267 BCE
15	Beta- 583577	YE 6/4/ 229cm	Charred material	2200 ± 30	250 BCE	268 BCE
16	Beta- 759208	YW11/3	Charred material	2220 ± 30	270 BCE	268 BCE
17	Beta - 519479	A3/2/ 207cm	Charred material	2190 ± 30	240 BCE	269 BCE
18	Beta 521462	YB 1/3/ 298cm	Charred material	2190±30	240 BCE	269 BCE
19	Beta - 640444	XM13/2/ 226cm	Charred material	2200 ± 30	250 BCE	271 BCE
20	Beta 521459	YF1/2/ 85cm	Charred material	2200 ± 30	250 BCE	276 BCE
21	Beta- 759207	YU11/3	Charred material	2270 ± 30	320 BCE	281 BCE
22	Beta 521458	YE1/2/ 93cm	Charred material	2210 ± 30	260 BCE	285 BCE
23	Beta 521461	ZA 1/3/ 273cm	Charred material	2160 ± 30	210 BCE	301 BCE
24	Beta - 620262	NA	Charred material	2230 ± 30	280 BCE	312 BCE
25	Beta - 519477	A2/4/ 315cm	Charred material	2230 ± 30	280 BCE	313 BCE
26	Beta- 583574	YD 3/1/ 333cm	Charred material	2270 ± 30	320 BCE	315 BCE
27	Beta 489243	YG6/SW	Charred material	2260 ± 30	310 BCE	316 BCE
28	Beta 454597	YF4/2/ 195cm	Charred material	2200 ± 30	250 BCE	320 BCE
29	Beta 454596	YF1/1/ 250cm	Charred material	2170 ± 30	220 BCE	332 BCE
30	Beta- 759209	YW11/2	Charred material	2490 ± 30	540 BCE	377 BCE
31	Beta- 583578	YE 6/4/ 300cm	Charred material	2400 ± 30	450 BCE	516 BCE
32	Beta - 519476	YP7/4/ 353cm	Charred material	2530 ± 30	580 BCE	531 BCE

S. No	Lab. No	Trench/ Layer/Depth	Material	Conventional Age in BP	Conventional Age	Calibrated Age
33	Beta-583576	YD 4/2/ 384cm	Charred material	2470 ± 30	520 BCE	540 BCE
34	Beta-583579	YS 8/4/ 350cm	Charred material	2490 ± 30	540 BCE	563 BCE
35	Beta-583575	YD 4/2/ 356cm	Charred material	2380 ± 30	430 BCE	467 BCE

The highest frequency of dates (14 nos.) falls in 3rd century BCE. The second highest number (8 nos.) comes from 4th century BCE. Four dates fall in 6th century BCE. Thus, the Keeladi site survived for about thousand years in the time range between 3rd century CE and 6th century BCE. The intensive activity of the settlement could be witnessed in 3rd-4th century BCE. Eighteen dates bracketed between 80 BCE-300 BCE. Nine dates fall between 300 BCE-500 BCE. Four dates fall within the range of 500 BCE-600 BCE.

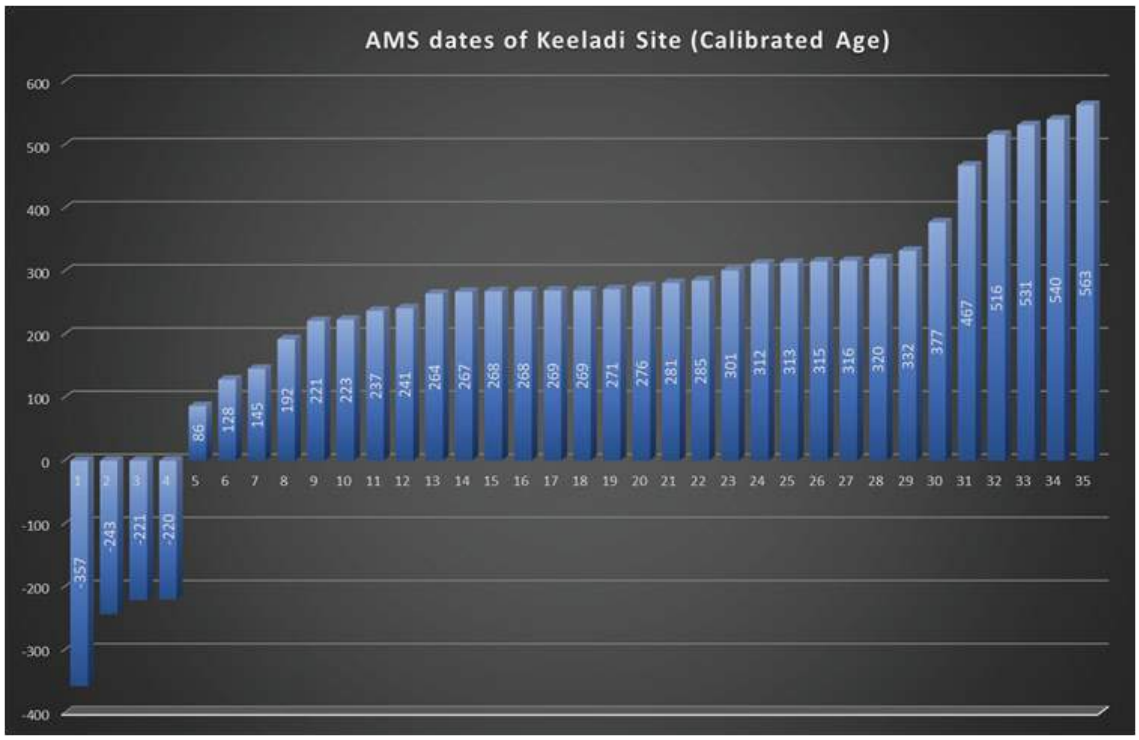

Fig. 5.50 Keeladi: Chart showing the distribution of AMS dates

The analysis reveals three distinct cultural phases in activity at the site, suggesting three separate phases of the Early HistoricPeriod:

- The late phase representing upper stratais dated to the early three centuries of the Common Era (1st century CE to 3rd-4th century CE). This period shows a high concentration of glass beads, suggesting widespread occupation and intensive activity.

- The middle phase (1st century BCE to 3rd-4th century BCE) represents the industrial structural complex and perhaps it is the time when theweaving complexalso flourished. While less intense than the first peak, this cluster of dates and associated finds indicates another notable period of use.
- The early phase covers the period between the 5th century BCE and the 6th century BCE. It marks the apparent beginning of human activity at the site, approximately around the 6th century BCE. Notably, a foot cultural deposit exists beneath these earliest dated strata that could not be dated for want of samples.

Thus, the overall picture suggests that the Keeladi settlement flourished during the Early Historic Period. The pre-Early Historic Period, representing the Iron Age yet to be exposed in clear terms. The future excavation of 110 acres of settlement may reveal the existence of early settlers.

The superimposition of artefact distribution with absolute dating clearly illustrates the evolving urban nature of the settlement till the late phase of the Early Historic Period. The accumulation of more artefacts, particularly glass beads, in the upper layers suggests a growth in settlement size and intensity over time. This pattern, where increasing human activity leads to denser deposition of artefacts in more recent layers, is typical of archaeological sites that experienced urban development. Critically examined, the C14 dates support this hypothesis, with a striking contrast in dates within the upper strata corresponding to the Common Era, indicating a peak in activity or population during that period.

While the overall pattern of increasing artefact density towards the surface supports the notion of the site transitioning from a less urban to a more developed state, the presence of outliers and the skewed distribution on the right side of the frequency graph serve as a reminder of potential complexities in stratigraphy or dating accuracy (Fig. 5.51). These factors could subtly influence interpretations, though the general trend remains clear. Furthermore, it is noteworthy that 11 conventional radiocarbon dates place activity in the pre-Asokanperiod,whereas 19 calibrated dates fallbetween 269 BCE and 563 BCE. Importantly, several Tamili (Tamil-Brahmi) inscribed potsherds were recovered in the pre-Asokan level, suggesting the existence of trade and cultural contacts with the north before Mauryan times.

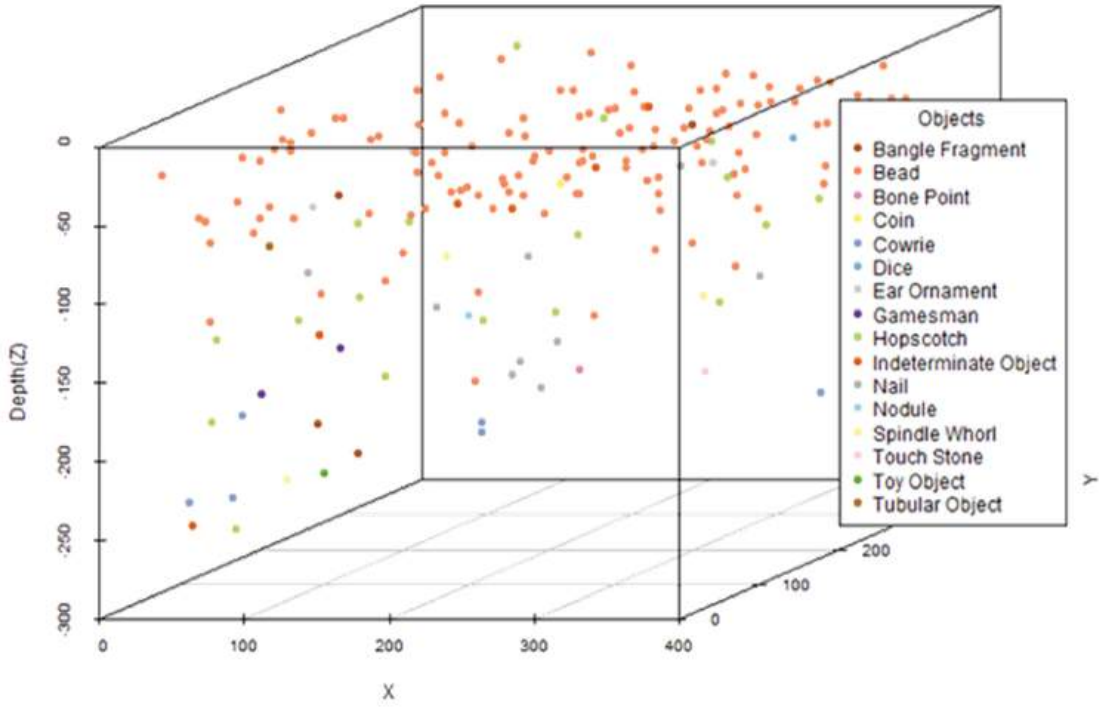

Fig. 5.51 Keeladi: Scatter plotting showing distribution of artefacts from the excavated quadrant at Keeladi

Conclusion

The archaeological evidence from Keeladi includes structural elements like brick buildings, terracotta ring wells and specially designed roofing tiles featuring dual holes and grooves for efficient rainwater harvesting, highlighting an advanced understanding of urban planning and environmental sustainability. The array of artefacts discovered, such as Roman and punch-marked coins, various pottery types including rouletted and arretine ware and beads crafted from semi-precious stones like carnelian and agate, pointsthe pivotal role of Keeladi in the intricate trade networks that spanned the Indian Ocean. Moreover, the presence of Tamiliinscriptions and graffiti on pottery sherds not only enriches our understanding of the linguistic landscape but also reflects a vibrant cultural life. Other findings like terracotta gamesmen, spindle whorls and fragments of gold ornaments offer insights into the everyday life and social practices of the Tamil people of that period.This paper discusses and sheds light on the significance of Keeladi as a buried urban center on the banks of river Vaigai and its contribution towards the antiquity and historicity of the region. It examines the contributions of the site to regional and interregional dynamics, positioning Keeladi as a centre for technological innovation, trade and cultural confluence.

At Keeladi, the excavation brought forth the archaeological evidence related to the occupation of weaving such as dyeing vats, the ring wells for the supply of water, open channels, closed channels made of bricks, spiral shaped pipes, barrel pipes, containers perhaps for preserving colouring materials, spindle whorls for spinning, needles of copper, bones with sharpened points used as shuttle and for flowery works etc. The archaeological evidences excavated at Keeladi ascertain the fact that the ancient Tamils engaged themselves in the occupation of weaving with high technical advancement, as referred in Sangam literature. The symbols and graffiti are very much suggestive of the symbolic and codified expressions and communication of the early people and their occurrence with Tamili inscribed potsherds opens new avenue for research.The accumulation of more artefacts, particularly glass beads, in the upper layers can be indicative of settlement growth over time. As a settlement grows into an urban centre, there would naturally be an increase in human activity, leading to more deposition of artefacts in the more recent layers. This pattern is typical in archaeological sites where urban development has occurred, with denser, more recent layers sitting atop less dense, older ones.

This nuanced distribution of urn types not only enriches our understanding of the burial practices prevalent at Kondagai also underscores the prominence of the red ware type as a recurring and prominent choice in the funerary tradition of the communities. The intricate patterns observed in the utilization of different ware types and the incorporation of distinctive lids contribute to the archaeological narrative, providing valuable insights into the cultural and ritualistic preferences of the community interred at Kondagai.

Furthermore, analysis of the vertical distribution of microliths at Agaram yields invaluable insights into the temporal and stratigraphic contexts enveloping these artefacts. The occurrence of microliths with increasing depth in the excavation trenches hints at potential shifts in cultural practices, evolving technological preferences or the sequential progression of human activities over temporal epochs. This multifaceted investigation provides a refined understanding of the diachronic aspects underlying the presence and distribution of microliths, thereby enriching the archaeological narrative and facilitating a more profound interpretation of the cultural evolution at the Agaram site.

By exploring the interplay of settlement, materials, structures, landscapes, rivers and human societies, this study enhances our understanding of the pluralistic interactions that shaped the ancient Tamil civilization within the broader canvas of South Asian cultures during the Early Historical Period

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Excavations at Kongalnagaram

R. Kaviya

Introduction

Kongalnagaram village (Lat. 10°40'33.28" N; Long. 77°11'27.77" E) is located 25 km east of Pollachi on the Pollachi-Dharapuram road in Kongalnagarm Panchayat, Udumalaipettai taluk of Tiruppur district in Tamil Nadu, India (Fig. 6.1). The habitation site covering 20 acres of land lies 1 km away from the present Kongalnagaram village and the burial site consists mostly of cairn circles entombing cist burial located in and around the Kongalnagaram village. Across three localities of the habitation mound and burial area, 14 trenches and 7 burial complexes were excavated which reveal socio-cultural aspects of our ancestors (Figs. 6.2-6.3).

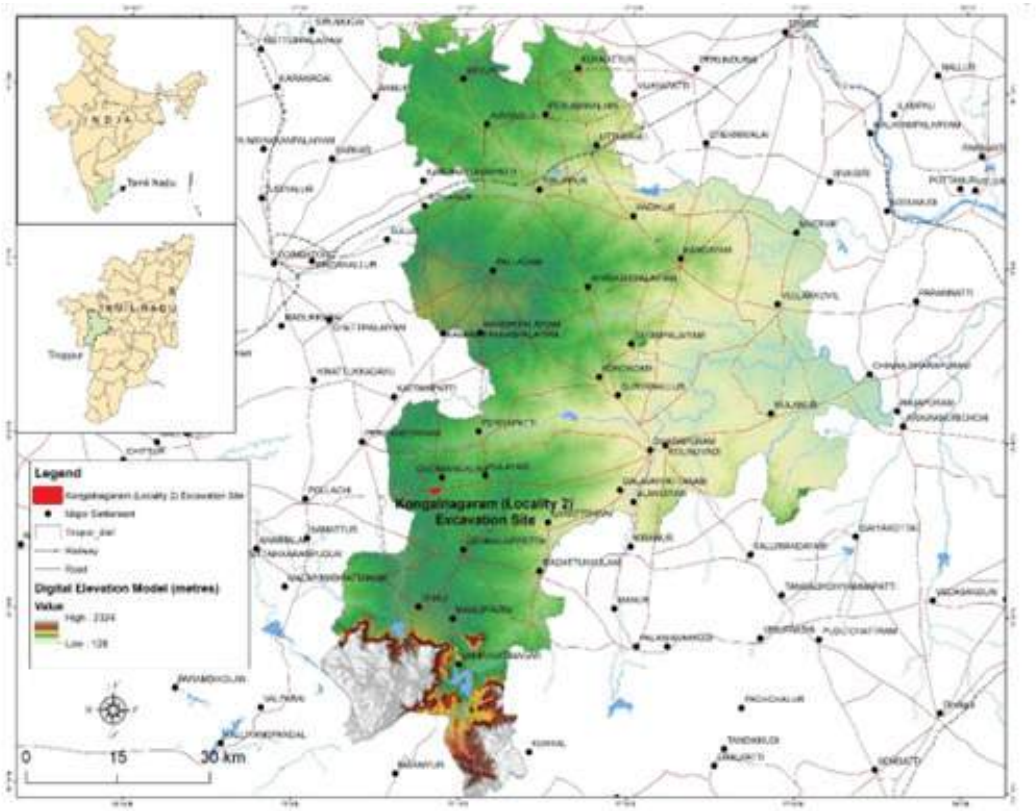

Fig. 6.1 Kongalnagaram: Study location map

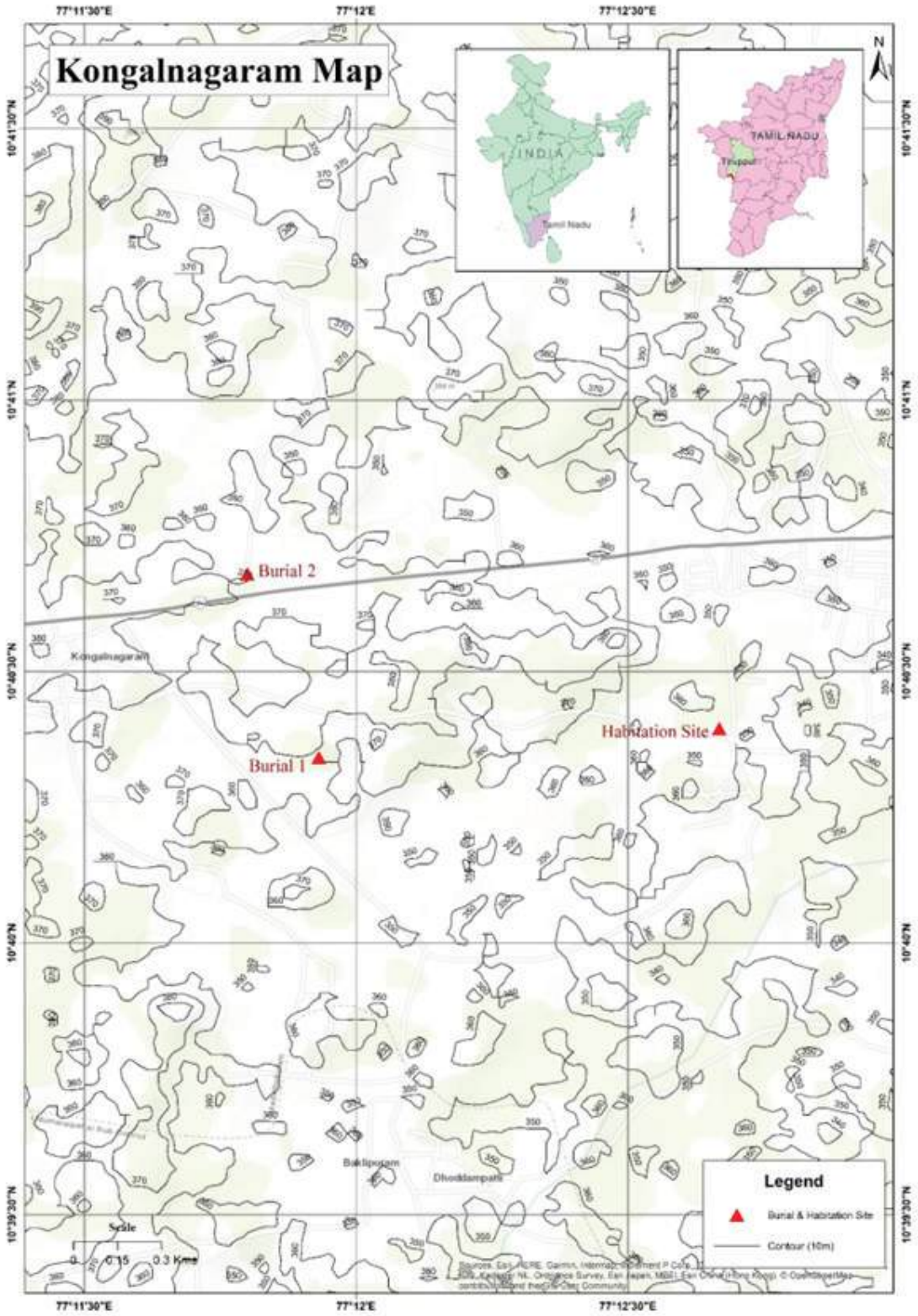

Fig. 6.2 Kongalnagaram: Contour map of habitation and burial

Fig. 6.3 Kongalnagaram: 14 Excavated Trenches in Habitation

Historical significance of Kongalnagaram

The famous Kongu region is studded with Iron Age sites, Rock Art sites and numerous Iron Age and Early Historic megalithic monuments. Among the four major geographical zones of Tamil Nadu, Kongumandalam covering the present Coimbatore, Tiruppur, Erode, Namakkal and part of Salem and Dharmapuri districts, along with three other contemporary geographical zones namely Tondaimandalam, Pandyamandalam and Cholamandalam, reflects a distinct cultural zone and remains under the control of Cheras for most part of the history.

More than 300 archaeological sites were documented in Kongu region. The famous ancient trade route called *Konga-p-peruvazhi* connecting the Chera capital *Vanji* in Kerala and Karur at the confluences of Amaravathi with Kaveri passes through Kongalnagaram. The explorations conducted at habitation-cum-burial site Kongalnagaram yielded graffiti and Tamili (Tamil Brahmi) inscribed potsherds besides a large number of russet-coated ware and black-and-red ware reflecting its cultural potentiality. The habitation mound covers an area of more than 20 acres and the mound rises to more than 2m above the present ground level. The graveyard consists of cairn circles and stone circles entombing simple cist, transepted cist and urn burials. One of the cairn circles has a menhir on its periphery. The majority area of the habitation mound falls under present coconut

grove cultivation, which has a high chance of preservation of the archaeological remains beneath the ground. Apart from graffiti and Tamili inscribed potsherds other important antiquities such as dabbers, ear ornaments, Chera coins, etc. were also recovered from the site during explorations.

The site has a dense distribution of russet coasted potsherds and black-and-red ware. The Iron Age megalithic graves located near Kaniyappar Masarayan temple were dismantled and the slabs were used in the construction of the temple's periphery wall. The distribution of the habitation mound, graves, inscribed potsherds, antiquities and inscriptions suggests its cultural significance. The vast industrialization and urbanization demand its early attention. It is a highly potential site to trace the origin of script in the region and also to study its cultural sequence and stratigraphical distribution.

Previous investigations

Previous studies undertaken around the site Kongalnagaram recorded it as an Iron Age-cum-Early Historical site. The burial site is reported with menhir and cist burials. The archaeological excavations conducted in the sites around Kongalnagaram include Boluvampatti, Molapalayam, Perur, Kodumanal, Karur, Nedungur and Porunthal, all along the major rivers such as Amaravathi and Noyyal. The excavations yielded evidences on industrial activities of gemstone, iron, copper, textile, shell and glass. The region is known for continuous industrial activities since the Early Historic Period. This is reflected in the availability of the maximum number of roman coins, punch marked coins, northern black polished ware, Tamili inscribed potsherds and semi-precious stone beads. The two AMS dates obtained at Molapalayam placed the human activities as early as 1547 and 1562 BCE (Beta 605456 and 605457).

Present Excavations

Habitation Cuttings

In Kongalnagaram, Wheeler's grid system of excavations was exclusively carried out with objective to situate the chronology of early historic period; to estimate the emergence of early historic settlement in the region; to understand the origin of graffiti and Tamili; to recognize the stratigraphical position of russet-coated ware; to identify the extent of the settlement both in terms of habitation and graves; and to understand the economic, social and cultural aspects of the region. Tamil Nadu State Department of Archaeology carried out systematic excavations at the site in the year 2024-2025. A total of fourteen trenches had been excavated across two localities in the habitation area namely, AK68, AN67,

Z84, AC91, AB88, AD91, AU82, AO86, AP86 and AC84 from Locality-1 and XBS4, XBR4, XBU5 and XBU4 from Locality-2.

In all the above mentioned trenches, excavation was carried out up to natural soil. Trenches are laid out in different localities of the mound to understand the distribution of antiquity and to explore the potential of the different parts of the mound. Each trench measures 5m × 5m with a baulk of 1m on all sides. The actual digging area of each trench is 4m × 4m. In habitation, 224 sq.mt area was dug up in the archaeological mound. At KNM-1 trenches were laid out in north-south orientation. In continuation to this, 7 megalithic burials had been excavated in Kongalnagaran which includes 5 cist burials, 1 menhir and 1 cairn circle.

Locality- I

Trench AK68

Trench AK68 is located on the eastern side near the centre of the mound, with an elevation of 364.5cm, revealed three layers (Layer 1, Layer 2 and Layer 3) and humus; with Layer 3 observed only in the western and northern sections (Fig. 6.4). Features such as dumps and pits were noted in the eastern, western and southern sections. A total of 199 antiquities were recovered, with beads being the most common, followed by hopscotch and 28 iron implements. Other finds included a ball (1), bangle (8), burnishing tool (2), celt (1), cowrie shell (1), copper objects (2), indeterminate terracotta objects (3), spindle whorl (3), toy object (3), wheel (1), dice (1) and an ear ornament (1). The highest antiquity concentrations were at 16cm and 70cm, each yielding 12 antiquities.

Fig. 6.4 Kongalnagaram: Locality -1 (Habitation)
Overview of the Trench AK68 and AN67

Trench AN67

Trench AN67 is located on the eastern side near the centre of the mound, with an elevation of 365cm. It was one of two trenches with similar stratigraphy, showing disturbances like dumps, pits, brickbats and rodent intrusions, indicating anthropogenic activity. The stratigraphy includes Layer 1, Layer 2, Layer 3, dumps and pits. Vertical excavation reached the natural lateritic soil and bedrock at 135cm. At 109cm on the southern side, intact pots prompted a supportive bed of 100cm (north-south) and 173cm (east-west) (Figs. 6.5-6.6). Iron and glass slags were noted sporadically, with graffiti sherds from 9-88cm. A total of 108 antiquities were recovered, primarily hopscotch (38) and beads (30); along with 16 iron objects, one copper object, spindles (2), shell bangles (4), cowrie shells (5), burnishing tools (2), an iron needle, a sling ball, a carnelian and an adze. The maximum number of antiquities (12) was retrieved at 28cm.

Fig. 6.5 Kongalnagaram: Pot in the southern section- Trench AN67

Fig. 6.6 Kongalnagaram: Russet-coated Painted Pot- Trench AN67

Trench Z84

Trench Z84 was excavated on the eastern side of the habitation mound. In order to investigate the extension of mound and its distribution; to study the stratigraphy (Figs. 6.7-6.8) and to understand the potential of the site through antiquities, pottery, graffiti and Tamili. A total of 237 antiquities were recovered, the highest from a single trench for this season, with hopscotch (125) being the most common, followed by beads (44) and terracotta wheels (15). Additionally, two grinding stones were found at 84cm along with 28 iron objects. The maximum number of 16 antiquities was recovered at 132cm. Excavation ceased at 225cm when natural soil appeared. The stratigraphy revealed two layers beneath the humus, differentiated by colour, composition, soil type and antiquity distribution based on stylistic and material differences.

Fig. 6.7 Kongalnagaram: Before Excavation- Trench Z84

Fig. 6.8 Kongalnagaram: Excavation in progress- Trench Z84

Trench AB88

Trench AB88, located on the northeastern side of Z84, was one of three trenches (with AC91 and AD91) excavated to study habitational deposition, antiquity distribution, pottery, graffiti and Tamili sherds (Fig. 6.9). The stratigraphy includes humus, layer-1, a dump and natural soil, with minimal deposition. The dump occupies a significant portion, suggesting substantial activity and infilling. A total of 75 antiquities were recovered, primarily hopscotch (49) and iron (8), along with bangle fragments, beads, indeterminate terracotta, ear ornaments, burnishing tools, wheels and a bone point. The maximum number of antiquities (21) was retrieved at 56cm.

Fig. 6.9 Kongalnagaram: Before Excavation- Trench AB88

Trench AC84

The trench AC84 provides a stratified chronological sequence of artefacts across humus and two distinct layers (layer-1 and layer-2). In the humus layer, no artefacts are explicitly recorded, suggesting minimal cultural deposition at the surface. The condition of artefacts varies with many rusted iron objects and some broken terracotta and shell objects, reflecting preservation challenges. Stratigraphically, layer-1 indicates later phase with a focus on iron, glass beads and terracotta; while layer-2, deeper and likely older, shows greater material diversity, suggesting evolving cultural practices or trade networks over time. The highest concentration of artefacts occurs between 60–80cm corresponding to the

upper part of layer-2, presided by layer-1. The 40–60cm range in layer-1 and 80–100cm range in layer-2 show significant activity. Fewer artefacts appear at greater depths, indicating a possible decrease in deposition or preservation deeper in the stratigraphy.

Trenches AC91 and AD91

Trenches AC91 and AD91, east of AB88, were excavated to study stratigraphy and to observe the findings of AB88. In AD91, stones appeared at 15cm on the southwestern side, forming a circular pattern at 41–45cm, prompting a supportive bed of 150cm from the southern section (Fig. 6.10). A soil colour change and partially broken pots were noted east of the stone circle. The baulk of AD91 was removed and AC91 was excavated to trace the full stone circle. Both trenches share similar stratigraphy (humus, layer-1 and bedrock). A total of 74 antiquities were recovered (36 from AD91 and 38 from AC91), with hopscotch (22 in AD91 and 23 in AC91) and iron objects (7 in AD91 and 9 in AC91) being most common, alongside beads, bangle fragments, burnishing tools, wheels and an indeterminate stone object.

Fig. 6.10 Kongalnagaram: Circular stone structure- Trench AC91 and AD91

Locality-2

Trench XBR4

Trench XBR4, south of XBU4, was excavated to 110cm, revealing two layers (Figs. 6.11-6.12). Antiquities appeared from 5–74cm, with 12 iron objects

recovered. The maximum antiquities were recovered at 32cm. Iron slags were found at 5, 15, 20, 28, 44, 52, 79 and 90cm. A perforated sherd (possibly a dish) was found at 36cm and a graffiti sherd at 44cm. Excavation of the trench stopped at denser bedrock.

Fig. 6.11 Kongalnagaram: Locality -2 (Habitation) Overview of the Trench XBR4, XBS4, XBU4 and XBU5

Fig. 6.12 Kongalnagaram: Trench XBR4 - Northern section

Trench XBS4

Trench XBS4, north of XBR4, was excavated to 90cm. Bedrock appeared at 50cm, with stones noted at 37cm (Fig. 6.13). The stratigraphy includes humus, Layer 1 and Layer 2. A total of 54 antiquities were recovered, primarily hopscotch (25) and iron (16); along with a ball, shell bangle fragments (2), wheels (4), indeterminate terracotta objects (4), an arrowhead, a chisel and an iron needle. The maximum number of artefacts (21) was retrieved at 16cm. Glass slags were found at 24 and 29cm, iron slags at 46cm and five lid knobs at 42cm.

Fig. 6.13 Kongalnagaram: Overview of the Trench XBR4 and XBS4

Trench XBU4

Trench XBU4, on the northwestern side, was excavated to 150cm to study antiquity distribution. Two layers were identified: humus (0–17cm, middle of southern section), layer-1 (3-19cm of western section) and Layer-2 which began at 18cm (minimum 9cm, maximum 66 cm). A total of 19 antiquities were recovered, primarily hopscotch (14), along with iron objects (2), a spindle whorl, a bangle fragment and a wheel. Terracotta (16) was the most common material. Antiquities appeared from 6–63cm, with the maximum (hopscotch) at 40cm. Glass slags were found at 25–33cm and iron slags at 40 and 63cm, suggesting glass and iron production. Bones and pottery diminished from 79–85cm. Bedrock (saprolite) appeared at the bottom, with raised undulations on the eastern and southern sides and a lower dip on the northwestern side. Excavation stopped at 150cm upon reaching denser bedrock.

Trench XBU5

Trench XBU5, west of XBU4, was excavated to 110cm. Two layers were observed: layer-1 (minimum 9cm, maximum 18cm; of the eastern section) and layer-2 (minimum 4cm, maximum 60cm; eastern section). Humus ranged from 0–18cm (northern section). Layer 1 is dark grey, silty and loose; Layer 2 is white, silty and loose. Bedrock appeared at 44cm. A total of 55 antiquities were recovered, primarily iron (23), followed by hopscotch (12), beads (8), copper (3), bangle fragments (3) and a stone ball. Iron objects and slags appeared at 24, 28, 48 and 56cm along with copper objects at 32–44cm, indicating iron production. Glass slags were noted at 24 and 44cm. Potsherds diminished from 85cm. Bedrock (saprolite) showed raised undulations on the southeastern side and flatter northern and western sides. Excavation stopped at 110cm.

Significant Findings from Habitation

A total of 1389 artefacts were retrieved from the habitation site at Kongalnagaram. Among the materials, terracotta objects accounting to 705 and 284 glass objects dominate the distribution out of the other materials which include amethyst, bone, bone/ivory, carnelian, copper, crystal quartz, faience, indeterminate, iron & copper, quartz, shell, soapstone, steatite and stone, alongside three Tamili inscribed potsherds and graffiti marked potsherds. It is noted here that the account of graffiti and Tamili, on potsherds were from the preliminary analysis of the pottery. In this assemblage of artefacts, hopscotch accounts for 41.11%, bead 23.69%, indeterminate iron object 21.09%, wheel 4.39%, bangle fragment 3.96%, spindle whorl 0.79% and cowrie 0.65%. These seven object types account for approximately 95.68% of all artefacts. The remaining 4.32% includes minor categories like nail, ring, burnishing tool, etc. Terracotta and glass are widespread across sites, indicating their common use, while rarer materials like amethyst and crystal quartz are sparsely distributed. The distribution of artefacts resembles a pareto distribution, commonly observed in archaeological datasets where a small number of categories dominate the total count. Here, approximately 86% of artefacts come from just three object types namely: hopscotch, bead and indeterminate iron object. While the remaining 13 types contribute only 14%. This skewed distribution suggests that a few object types were mass-produced or widely used, while others (e.g., dice, lydite touchstone) were rare or specialized.

The artefacts concentration at the top level observed in the vertical distribution, especially in the trenches Z84 with 237 artefacts followed by AK68

with 204 artefacts having dominating artefact quantities both from Locality-I. The cultural deposit in Locality-II accounts only for a meter deep which show an interesting pattern with absence at places and very scarce occurrence of glass made objects, which hints chronologically as an earlier settlement unit than Locality-I.

Tamili

Tamili inscribed potsherds are significant archaeological findings that offer crucial insights into the ancient history, language and literacy of Tamil Nadu. Tamili inscribed potsherds unearthed reading *maṟuta*… in trench XBU5 at a depth of 32cm, *t akē* in AN67 at a depth of 91cm and *taṉ vē*… in the first line and *āvōnē* in the second line of trench AB88 at a depth of 60cm which are culturally stratified at layer-2 (Figs. 6.14-6.16). The two-line inscription is palaeographically observed to be of later period, while the other two inscribed sherds can be dated much earlier, at least a few centuries apart, discernible by stylistic and palaeographical characteristics.

Fig. 6.14 Kongalnagaram: Tamili inscribed potsherd, 32 cm, Trench XBU5, Locality-2 (Habitation)

Fig. 6.15 Kongalnagaram: Tamili inscribed potsherd, 91 cm,Trench AN67, Locality-1 (Habitation)

Fig. 6.16 Kongalnagaram: Tamili inscribed sherd, 60 cm, Trench AB88, Locality- 1 (Habitation)

Graffiti

The graffiti recovered while sorting potteries from Kongalnagaram excavations shows frequency of its occurrences across various depth ranges skewed at the top level. It is stated here that only part of the assemblage was studied at the time of the preparation of the status report. The preliminary data from the sorted pottery assemblage shows a peak frequency in

the top level at layer-1 with 143 occurrences, followed closely between 40 and 80cm depth with 123 and 120 occurrences, respectively. Frequencies decline steadily beyond 120cm. The lower depth ranges have hardly any yield. This trend of vertical distribution of graffiti has striking similarities with distributions of artefacts. Graffiti were observed mostly on the exterior part of the potsherds. Graffiti were found mostly in black-and-red ware with 386 numbers, red slipped ware with 165 numbers, russet-coated painted ware with 79 numbers and rest of the pottery types accounts for 50 numbers that include black slipped ware, brown slipped ware, etc.

Hopscotch

Hopscotch/disk, a simple plain round artefact made frequently of flat potsherds, terracotta and sometimes stone, is widely construed as a children's play tool. These objects are the dominating artefact account for 571 numbers from the assemblage at Kongalnagaram. The cultural transformations of this artefact are observed to have designed predominantly from repurposed potsherds. This was generally crafted from medium to thick pottery fabrics, shaped into a polygonal form by cutting away the edges and subsequently abraded against a coarse surface until the edges are rounded and worn.

Beads

A total of 335 beads were unearthed, with a diverse range of materials used for adornment. Statistically, glass beads dominate the assemblage, constituting approximately 82.1% (275 out of 335) of the total beads, suggesting either a high prevalence of glassmaking technology, extensive trade in glass beads or their common use in the society. Following this, soapstone (3.9%, 13 beads) and terracotta (3.3%, 11 beads) beads are the next most frequent materials. Other bead materials include amethyst (3.0%, 10 beads), steatite (2.1%, 7 beads), faience (1.8%, 6 beads) and shell (1.8%, 6 beads) appear in smaller but notable quantities, while quartz (1.2%, 4 beads), carnelian (0.6%, 2 beads) and crystal quartz (0.3%, 1 bead) are comparatively rare.

The study of vertical distribution shows that the glass beads peaked between the depths of 30 and 50cm in layer-1 and found occurring until 110cm in layer-2 in considerable quantity, then falls steeply down beneath this level.

Spindle Whorl

A weaver's tool that is used for extracting thread out of cotton, found in pear-shaped or truncated cone-shaped spindle whorl made out of terracotta with

thin grooves on the surface observed to have holes running transversely without any iron shaft was unearthed. 11 spindle whorls were recovered from the excavation.

Terracotta Wheel

A circular disk-shaped object made out of terracotta with a hole at the centre was recovered. Many of the wheels are well-proportioned. These account for 61 in numbers which is considerably larger in terms of quantity in relation to other artefacts found at the site.

Iron objects

Iron objects account for the third material that dominates in quantity. About 264 iron objects were unearthed. However, discernible iron objects remain scanty in numbers which are nail, needle, ring, arrow head, chisel and knife. Majority of the iron objects remain unintelligible.

Important Findings from Habitation

Ivory Dice

An ivory made cuboidal-shaped dice slightly broken in condition was retrieved from trench AK68 at a depth of 28cm (Figs. 6.17-6.18). It measures 5.2cm in length, 1.2cm in breadth and 0.7cm in thickness. The dice weighs 5.67 grams.

Fig. 6.17 Kongalnagaram: Ivory Dice

Fig. 6.18 Kongalnagaram: Ivory Dice

Decorated ear ornament

A fragment of a decorated ear ornament found in trench AB88 at a depth of 68cm. The broken piece has a diameter of 4cm, a thickness of 1.2cm and weighs 20.02 grams. The decorations show an incised triangular pattern.

Russet-Coated Painted Ware (RCPW)

The region is found with dense cluster of russet-coated painted ware which are observed on both black-and-red ware as well as red slipped ware (Figs. 6.19-6.20). From a study of single trench Z84, 27 different pattern decorations were classified and many designs were unintelligible. The strong association of certain patterns with specific depth ranges indicate chronological layering. Many of the pattern falls in the layer 2. The pattern-wise RCPW quantity clearly demonstrates that the distribution of these patterns is highly uneven. The vertical distribution of russet-coated painted ware shows that RCPW is not evenly distributed across all depths. The russet-coated ware shows concentration in layer-2 associated with artefacts like spindle whorl, glass beads, terracotta wheel, hopscotch, graffiti inscribed potsherds and grey ware. These were painted more on BRW type than RSW. The distribution is in contrast to the distribution of artefacts and graffiti. While the artefacts and graffiti show right skew, RCPW show left skew distribution.

There is a strong and unimodal concentration of these potsherds in a specific vertical stratum, primarily between 150 and 220 units of depth. This suggests a particular period or phase of deposition where this ware was most prevalent. The presence of some of these sherds at shallower or deeper extremes indicates earlier/ later use, redeposition or post-depositional disturbances. The RCPW designs on the pottery surface conclusively show that decoration on these potsherds is almost exclusively applied to the outer surface. The variations in depth distributions for different patterns, combined with the period strongly suggest that certain patterns can serve as chronological or stratigraphic markers.

Patterns concentrated at deeper levels likely represent older periods, while those at shallower levels (if more abundant) would be more recent. The general clustering of the most frequent patterns within the core depth range (150-220 cm) further reinforces the stratigraphic significance. The "unidentifiable" category is a very large group found across a wide range of depths, particularly at deeper levels and represents a significant portion of the total count. This indicates that a substantial amount of the recovered RCPW is too fragmentary or eroded to be classified into specific patterns or falls outside the defined typology.

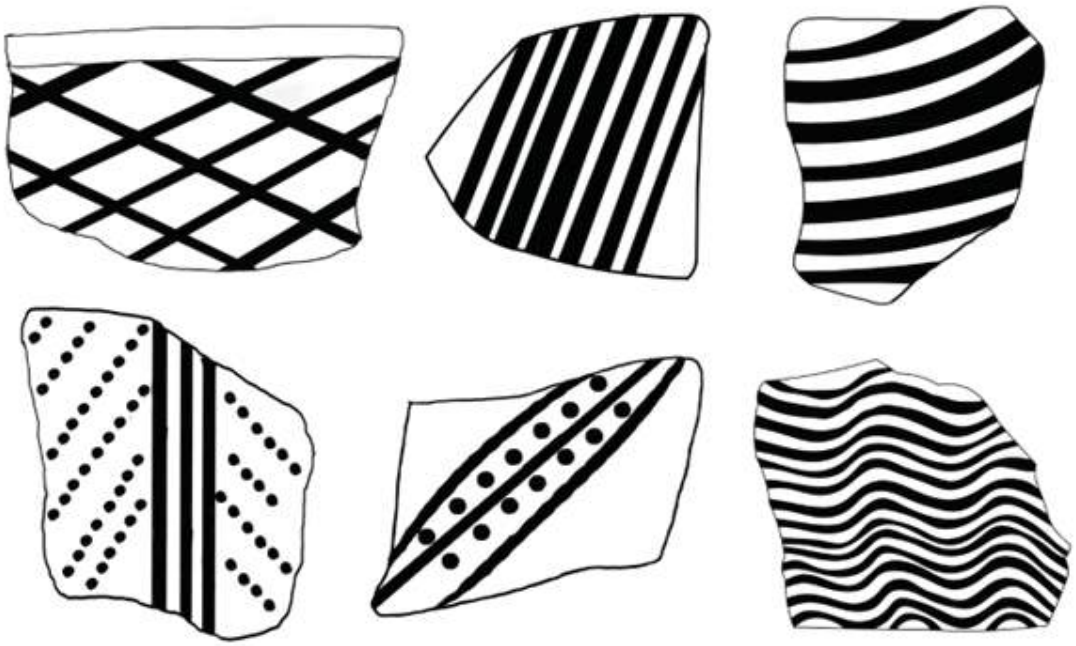

Fig. 6.19 Kongalnagaram: Russet-Coated Painted ware- Trench Z84

Fig. 6.20 Kongalnagaram: Russet-Coated Painted ware potsherds

Excavations of Graves

Seven megalithic burials were excavated from Kongalnagaram (Figs. 6.21-6.22). Megalith-1 to Megalith-5 is a cist burial located behind the Kanniyappar Masarayan temple and Megalith-6 is a menhir burial located 720m south of Meg.-1 to 5 and Megalith 7 is a cairn circle.

Fig. 6.21 Kongalnagaram: Aerial view of the excavated graves

Fig. 6.22 Kongalnagaram: Aerial view of the excavated graves

Megalith -1

Megalith-1 is situated on the southern side of the site, in proximity to Megalith-3 towards the east. A 5-meter quadrant was established from the central point of the cist for excavation. Prior to digging, photo and video documentation were completed. Excavation was carried out following a quadrant methodology, through which all four orthostats were systematically exposed. Following this, excavation proceeded inside the cist and the maximum depth recorded inside the cist was 143cm.

Orthostat	Length (cm)	Breadth (cm)
1	138	120
2	142	93
3	107	87
4	146	55
Porthole	37	55

Cist inner measurements

Inside cist measurements	East to West (cm)	North to South (cm)
Top	90	47
Bottom	133	78

Findings

During the excavation of Megalith-1, a total of 19 offering pots were recovered as part of the burial assemblage, thirteen offering pots were found within the cist and 6 from outside the cist. Notably, an intact Red Slipped Ware (RSW) pot was recovered from the eastern side of the cist along with a semi-broken Russet-coated Painted Ware (RCPW) pot.

These vessels varied in form, size and condition; and were found at different stratigraphic levels within the burial chamber, with many exhibiting deliberate placement. Among the internal finds were dishes on stands, bowls, ring stands and pots; while some intact and others broken or fragmentary were retrieved. Many of them retaining soil sediment indicative of ritual use or prolonged exposure. Notable examples include an intact RSW dish-on-stand (OP1), a well-preserved ring stand and dish pair (OP3 and OP4) found in spatial association at 116cm depth, suggesting purposeful deposition. Other vessels, such as OP5 (a broken RCPW bowl) and OP6 (a BRW bowl and dish) further illustrate the ceramic diversity and funerary customs. A notable concentration of vessels was

found around the 132–135cm depth, many of which were fragmentary yet can be reconstructed, including RSW and BRW bowls and dishes. Outside the cist, an assemblage of six vessels were found on the eastern side, including an intact RSW pot (OP15) with a matching lid (OP16), both associated with additional fragmented pots (OP17–OP19), indicating a secondary ritual zone or extended funerary practice beyond the cist. The range in vessel typology, surface treatment orientation and preservation suggest a complex mortuary behaviour with symbolic placement of grave goods, likely reflecting the social or ritual significance of the deceased and the broader cultural practices of the megalithic community.

A total of 19 offering pots were found associated to megalith-1, among this 13 were found inside the cist and 6 from outside. Outside the cist burial an intact RSW pot was found on the eastern side, along with semi broken RCPW pot. Mollusks were observed from the depth of 44cm and continues till the bottom of the cist. Multiple bioturbations were observed from the depth of 89cm on the northwestern side and 97cm on the northern side. No iron objects were found inside and outside the cist.

A) Bones

Bone fragments were observed on the northern chamber in the north western side with a depth of 135cm and a stone was observed above it. The human bones were found in fragile condition and hence identification of them is hard. No human teeth were found. Animal vertebrae and other fragmented long animal bones were found. Both human bones and animal bones had been found in the burial.

B) Grave Goods

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
1	RSW	Ring stand	91 cm	Inside the cist	An intact ring stand of red slipped ware was found inside the cist at a depth of 91cm with its rim facing upwards.
2	RSW	Ring stand	93 cm	Inside the cist	A broken rim portion of red slipped ware was found inside the cist at a depth of 93cm, with its rim facing south-eastern side.

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
3	RSW	Ring stand	116 cm	Inside the cist	An intact RSW ring stand found at a depth of 116cm and it is observed facing eastwards. It measures 5.1cm in height and 5.6cm in breadth and 1.3cm in thickness. OP 3 is found to the north of OP 4 and in association with it. OP 3 is observed in the northern chamber.
4	RSW	Ring stand	116 cm	Inside the cist	An intact ring stand of red slipped ware was found inside the cist at a depth of 116cm with its rim facing eastern side. OP4 is found to the south of OP3 and in association with it. OP4 is found in the Southern chamber.
5	RSRCPW	Bowl	113.5 cm	Inside the cist	A broken bowl of red slipped russet-coated painted ware was found inside the cist at a depth of 113.5cm, facing northern side.
6	Bowl - BRRCW, Lid -BSW	Bowl and lid	117 cm	Inside the cist	A bowl of black-and-red russet-coated ware and a lid of black slipped ware were found inside the cist at a depth of 117cm, facing upwards. The bowl is intact and the dish is broken and could not be mended. Both were found together.
7	RSRCW	Bowl	123 cm	Inside the cist	An intact bowl of red slipped russet-coated ware was found inside the cist at a depth of 123cm with its rim facing the east side.
8	RSRCPW	Bowl	135 cm	Inside the cist	A broken red slipped russet-coated painted ware bowl was found facing upward at a depth of 135cm. It is found in pieces which could be mended and many sherds were not found.

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
9	RSRCPW	Pot	132 cm	Inside the cist	A broken red slipped russet-coated painted ware pot was found inside the cist in broken condition, which could be mended.
10	RSRCPW	Pot	132 cm	Inside the cist	A broken red slipped russet-coated painted ware pot was found inside the cist in broken condition, which could be mended and many sherds of which were not found.
11	RSW	Dish	132 cm	Inside the cist	A broken RSW dish was found with the thickness of 0.7cm, inner diameter is 14.5cm and the outer diameter is 16cm.
12	RSW	Bowl	132 cm	Inside the cist	A broken RSW bowl is observed inside the cist which could be mended but many sherds of which were not found. The thickness of the bowl is 0.6cm.
13	BRRCW	Bowl	132 cm	Inside the cist	A black-and-red russet-coated ware bowl is found inside the cist. It is found in broken condition and could be mended. The height of the pot is 9cm, breadth is 15cm, thickness is 0.5cm, inner diameter is 14.3cm and outer diameter is 14.9cm.
14	BRRCW	Pot	108 cm	Outside the cist	A black-and-red russet-coated ware pot found outside the cist in broken condition and could not be mended. The thickness is 2cm, has the inner diameter of 16.2cm and outer diameter of 18cm.
15	RSW	Pot	118 cm	Outside the cist	An intact RSW pot found outside the cist, facing east. The height of the pot is 23.8cm, breadth is 22.5cm, thickness is 1cm, inner diameter is 9cm and outer diameter is 9.5cm. This pot found alongside with OP 16, 17 and 18.

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
16	RSW	Lid	110 cm	Outside the cist	An intact RSW lid found outside the cist facing east. The lid has height of 3cm, breadth 11.8cm, thickness 0.8cm and diameter of 8.2cm. This lid found in association with OP 15, 17, 18 and 19.
17	BRRCPW	Pot	110 cm	Outside the cist	A black-and-red russet-coated painted ware pot found outside the cist in broken condition and could not be mended as many sherds were not found. The inner diameter is 16.2cm and outer diameter is 17.9cm. This pot found in association with OP 15, 16, 18 and 19.
18	RSRCPW	Pot	110 cm	Outside the cist	A red slipped russet-coated painted ware pot found outside the cist facing upwards in broken condition and it could not be mended as many sherds were missing. The dimension of this pot could not be measured due to its broken condition. This pot is found in association with OP 15, 16, 17 and 19.
19		Pot	110 cm	Outside the cist	OP 19 is found outside the cist in the eastern side. It is observed in an inverted position, along with OP 15, OP 16, OP 17 and OP 18. It is found in broken condition and it could be mended. Inner diameter of this pot is 11cm and outer diameter is 11.6cm.

Megalith - 2

Megalith 2 is found on the northern side of Megalith 3 and to the North western side of Meg.-4. A quadrant of 3m is established from the center of the cist. After photo and video documentation digging is carried out in quadrant method and all four orthostats were exposed. After which, exposing the interior of the cist was carried out. The end depth is 121cm.

Orthostat	Length (cm)	Breadth (cm)
1	124	68
2	108	74
3	116	49
4	108	74
Porthole	27	30

Cist inner measurements

Inside cist measurements	East to West (cm)	North to South (cm)
Top	54	42
Bottom	93	59.5

Findings

A total of 10 offering pots were found inside the cist. Outside the cist on the eastern side, a ring stand is observed. Inside this cist to a depth of 89cm soil potsherds or any other materials were absent and at a depth of 89cm, 3 dishes were observed and they were broken into fragments and could not be mended. Root intrusions were observed till the depth of 90cm and bioturbation also been observed at a depth of 110cm on the northwestern side of the cist.

Bones

In the south western side of the cist at a depth of 94cm a large-sized bone fragment was observed which could be of an animal. It is located 14cm from the west, 14cm from the south, 44cm from the north and 72cm from the east. In the northern chamber at a depth at a depth of 111cm fragmented bones were found in cluster near the chamber wall measuring 35cm from north and 30cm from east. Only a few fragments of human bone had been found.

Grave Goods

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
1	Unknown	Ring Stand	97 cm	Outside the cist	Ring stand is found outside of the cist on the eastern side. It is found at a depth of 97cm facing east, it is broken in condition and could not be mended.
2	Bowl - BRW, Ring stand – RSW	Bowl with ring stand	94 cm	Inside the cist	An intact Bowl of black-and-red ware with a ring stand was found inside the cist at a depth of 94cm, with its rim facing north-west.

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
3	BRW	Bowl	97.5 cm	Inside the cist	An intact black-and-red ware bowl was found inside the cist at a depth of 97.5cm with its rim facing northeast. Soil sediment is present inside the OP3.
4	RSW	Lid	99 cm	Inside the cist	An intact lid of red slipped ware was found inside the cist, facing north-west at a depth of 99cm.
5	BRW	Bowl	105 cm	Inside the cist	A broken bowl of black-and-red ware was found inside the cist at a depth of 105cm, with its rim facing upward.
6	BRRCPW	Bowl	108 cm	Inside the cist	An intact black-and-red russet-coated painted ware bowl on the outer surface was found inside the cist at a depth of 108cm, with its rim facing north-west.
7	BRW	Pot	92 cm	Inside the cist	A BRW pot was found inside the cist facing southwest. Soil sediment is present. It is broken in condition and could be mended but multiple sherds were missing. The breadth of the rim is 13.7 cm
8	BRW	Dish	92 cm	Inside the cist	A broken BRW dish was found inside the cist facing upward. Graffiti is found on the interior surface of the dish. The OP has a height of 4.6cm, thickness is 0.8cm, inner diameter is 18.5cm and outer diameter is 22cm.
9	BRW	Dish	92 cm	Inside the cist	A broken BRW dish was found inside the cist facing upward. It is found embedded inside OP 8. Graffiti is found on the interior surface of the dish, same as OP8. The dish has a height of 5cm, a thickness of 0.7cm, an inner diameter of 17.1cm and an outer diameter of 19cm.

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
10	BRW	Dish	92 cm	Inside the cist	A broken BRW dish was found inside the cist facing upward. It is embedded inside OP 8 and OP 9. Graffiti is found on the interior surface of the dish, similar as OP 8 and OP 9. It has a height of 3.5cm, a thickness of 0.9cm, an inner diameter of 16.6cm and an outer diameter of 18.6cm.
11	BRW	Dish	92 cm	Inside the cist	A broken BRW dish was found inside the cist.

Antiquity

A shell bangle is found inside the cist at a depth of 111.5cm in the northern chamber measuring 53cm from the northern wall, 25cm from the southern wall, 36cm from the eastern wall and 36cm from the western wall. It is a single bangle broken into 3 pieces.

Megalith-3

The Megalith 3 is present south of Megalith 4. A quadrant of 3m radius and 25cm baulk is laid out from the centre of the cist. A calcrete stone circle is traced around the cist with an inner diameter of 281cm and an outer diameter of 327cm. The starting depth of porthole is 58cm.

The cist is deposited with highly compact soil and large stones which is observed till bottom of the cist. Offering pots, bones and iron objects were observed inside the cist and outside the cist. The end depth is 170cm. No separate passage was found inside the cist. No human bones were found in the cist. Huge quantity of RSW, BRW and RCPW loose sherds were found inside the cist till the depth of 170cm which couldn't be mended.

Orthostat	Length (cm)	Breadth (cm)	Thickness (cm)
1	131	122	-------
2	55	127	120
3	72	69	7.5
4	71.5	103	10
Porthole	38 (EW)	38(NS)	
Porthole stone	71	73	

Fig. 6.23 Kongalnagaram: Exposing the Cist burial

Cist inner measurements

Inside cist measurements	East to West (cm)	North to South (cm)
Top	102	72
Bottom	164	83

Iron object

Iron objects were traced inside and outside of the cist. The first Iron object was traced at a depth of 127cm, outside of the cist and 35cm away from the Port hole. Iron objects were found along with black-and-red ware pot sherds. Iron objects found outside the cist were fragile and broken in small pieces due to rusting and weathering. Broken iron pieces were retrieved from inside of the cist. Iron fragments observed from inside the cist are in meagre quantity and very fragile in nature.

Bones

At the depth of 168cm animal bone was observed on the northern side of the cist. These bones were observed in small cluster and were fragile in nature. These were the fragments of long bone, ribs, skull and a few unidentifiable bones (Fig. 6.23).

Grave Goods

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
1	BRW	Pot	128 cm	Inside the cist	The first grave good was observed at a depth of 128cm. A black and red ware pot facing upwards located near the port hole. The pot is found in broken condition only rim and neck portion was retrieved. It has everted flat rim with thickness of 0.9cm.
2	BRRCW	Pot	143 cm	Inside the cist	A black and red russet-coated ware pot was retrieved inside the cist in southwestern side at a depth of 143cm with its rim facing upwards. The pot has a thickness of 0.7cm. The pot is broken and retrieved as multiple pieces that could not be mended.
3	RSW	Ring stand	164.5 cm	Inside the cist	An RSW ring stand was retrieved inside the cist on the north eastern side at a depth of 164.5cm, closer to the porthole. This OP3 is completely broken and it could not be mended as many broken sherds could not be found.

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
4	BRRCPW	Rim sherd	154.5 cm	Inside the cist	A black-and-red russet-coated painted ware with graffiti mark was retrieved inside the cist at a depth of 154.5cm. The type of the rim is everted flat rim. The sherd was observed on the southern side closer to the chamber stone slab. The graffiti was found on the outside of the sherd, near its rim. The thickness of the sherd is 0.8cm.

Fig. 6.24 Kongalnagaram: Megalith 4-cist burial site

Decorated potsherd

Two decorated potsherds with incision pattern were found at a depth of 125cm and 142cm.

Megalith - 4

The Megalith-4 is found between Megalith-3 and Megalith-2, a 3m radius quadrant and 25cm baulk is established from the center of the cist (Fig. 6.24). The porthole is present on the eastern orthostat and it is covered with a stone slab. The end depth of the cist is 97cm. No animal bones were found. No passage is present in the bottom. The starting depth of porthole is 20cm. The dimensions of the cist are as follows:

Orthostat	Length (cm)	Breadth (cm)	Thickness (cm)
1	96.5	77	7
2	53.5	72	6
3	54	42.5	8
4	56	60	7.2
Porthole	24 EW	25 NS	8
Porthole stone	43.5	41	5.3

Cist inner measurements

Inside cist measurements	East to West (cm)	North to South (cm)
Top	18	28
Bottom	79	52

Findings

A total of 7 offering pots were found from inside the cist. An incomplete skeletal remains with cranium, a fragment of mandible, ribs, pelvis (only a pair of Ilium), fragments of long bones, a clavicle, vertebrae, few metacarpals, metatarsal and phalanges along with other unidentified bone fragments were found in the southern portion of the cist. The skeletal remains started to appear from 86cm. An antimony rod was found in the south-east corner inside the cist beside the skull. Mollusks started to appear from a depth of 77cm and animal intrusions were observed from 69cm, thin slices of granite were observed from a depth of 85cm. The port hole started to appear at a depth of 66cm.

Grave goods

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
1	BRW	Pot	77 cm	Inside the cist	The rim of the pot was observed at a depth of 77cm, it was facing northwest direction. A medium sized russet-coated ware, with everted rim and body with fine texture. Located near the porthole in the northeast direction, beside the skull fragment. The pot has a few missing rim pieces and is fragmented but can be mended. The OP has an inner diameter of 9.8cm, outer diameter of 13.7cm, a thickness of 0.7cm and a height of 20cm. A copper bowl was found inside the pot, with rim facing upward. It has a diameter of 11.6cm on top and 6cm at bottom, it has a thickness of 0.6cm and height of 8.2cm.
2	BRW	Pot	89 cm	Inside the cist	The pot started to appear at 89cm, it was in fragile condition and half portion of the pot was removed in a fragmented form. The rim is everted and flat, facing upwards. It is a black-and-red ware of fine texture. It is observed in the northwest corner. Bone fragments are observed near the base of the pot. OP2 found northwest to OP1. The OP has an inner diameter of 10cm, outer diameter of 13cm, thickness of 0.5cm and height of 12cm.
3	BRW	Lid	85 cm	Inside the cist	The OP3 is a lid, found fully intact, facing upwards at a depth of 85cm. It is a black-and red-ware of fine texture. It is embedded in the northwest corner, near the OP2. Along with the human bones. The OP has a diameter of 12.9cm, thickness of 0.5cm and height of 2.5cm.

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
4	RW	Lid	90 cm	Inside the cist	The OP4 is a lid retrieved in fragments that can be mended together, facing west at a depth of 90cm. It is a red ware of fine texture. It is observed in the north and OP3 is present beside it. The OP has a diameter of 10cm, thickness of 0.6cm and height of 5.2cm.
5	BRW	Lid	91 cm	Inside the cist	The lid is fragmented and can be mended, facing west at a depth of 91cm. It is black-and-red ware of fine texture. It is observed in the northeast with its rim facing west. It is observed between OP4 and OP6. The OP has a diameter of 10.5cm, thickness of 0.5cm and a height of 3.2cm.
6	BRW	Lid	86.5 cm	Inside the cist	OP6 is a lid facing upward at a depth of 86.5cm. It is a black-and-red ware, of fine texture. It is observed on the northeast corner, beside OP5. The OP has a diameter of 15.3cm, thickness of 0.6cm and height of 3cm.
7	BRW	Lid	92.5 cm	Inside the cist	A BRW pot was found inside the cist facing southwest. It is broken in condition and could be mended but multiple sherds were missing. The breadth of the rim is 13.7 cm

Bones

Skull – The skull was retrieved in 3 pieces; the cranium was found in 2 pieces and a mandible fragment was found below it. The anterior part of the skull was facing southeast tilted slightly upward. The teeth were found intact in the maxilla. The pieces of the cranium were in fragments but were held together due to the presence of soil inside the cranium. The full extent of the anterior portion of the cranium is broken and not complete.

Teeth – Three loose teeth were found and three teeth are visible in the maxilla, others are covered in soil. Eight teeth are found in the mandible fragment.

Clavicle – The clavicle was retrieved as a complete part. It was found in the southeast direction, near the south wall.

Ribs - The ribs were found in a bunch together near the south wall in the southeast. The ribs were fragile and thus were removed as fragments. One of the ribs was found with an anomaly which could have been caused due to pathology.

Ilium – The pair of bones was observed embedded in the south wall towards the southwest direction.

Long bones

Humerus - The right and left humerus have been found; both are broken. One was found embedded in the wall, while the other beside the skull towards the west.

Tibia and Fibula - A pair of Tibia and fibula has been found, one pair (possibly right) towards the south wall, with the proximal end of tibia towards the porthole and the distal end towards northwest direction, another pair (possibly left) with its proximal end towards southwest direction and the distal end towards northeast direction.

Femur – A complete femur (possibly right) with its proximal side towards the porthole (east) and the distal side embedded in the south wall.

A long bone fragment (possibly left femur) was found beside the femur embedded in the west wall.

A few metacarpals, metatarsals and phalanges were found and some unidentified bone fragments were also collected.

Antiquity

Copper Bowl - A copper bowl was found inside the offering pot no. 1 against the porthole of Megalith-4. It is a simple cist burial facing east, with a round porthole. It is a copper bowl, looks like a high-tin bronze bowl, but this is subject to metallurgical analysis.

Although the copper bowl was found inside the partly broken black-and-red russet-coated painted ware (BRRCPW) pot, with graffiti engraved on the shoulder portion of the pot, the diameter of the mouth of the copper bowl is larger than the mouth of BRRCPW pot therefore it is difficult to place the copper bowl inside the pot. It is more likely that the bowl was placed at the mouth of the pot. Since the BRRCPW pot is broken, it may have lowered down into the pot.

The bowl measures 8.2cm in height, with a thickness of 0.7cm. Its mouth diameter is 11.6cm, the bottom diameter is 6.1cm and it weighs 415.56 grams.

The BRRCPW pot containing the bowl had been kept on the floor slab. A skull is found on the south-eastern corner of the chamber, just behind that, below the porthole an antimony rod is placed close to the pot containing the copper bowl.

Human bones were also found close to the southern orthostat placed in a scattered manner. The available bones clearly suggest that it is a secondary burial.

Antimony rod – It is found in intact condition, in the posterior side (west) of the skull at a depth of 91cm.

Megalith-5

The Megalith-5 is present in the north of Megalith-2. A quadrant of 3m radius with 25cm baulk is laid to expose around the cist. The porthole was present on the wall of the east orthostat and it was covered with a stone slab. The end depth was 140.5cm. No human bones were found. Composition of the soil sediment was loose. Calcium stone deposits and stone slabs were found inside the cist. Bone fragments along with offering pots were retrieved from the cist. Separate chamber stone was present in the cist at a depth of 117m.

Orthostat	Length (cm)	Breadth (cm)	Thickness (cm)
1	119	98	8
2	67.5	75	9
3	66	61	4
4	67	71	7.5
Porthole	26 EW	28 NS	8
Porthole stone	47	50	11

Cist inner measurements

Inside cist measurements	East to West (cm)	North to South (cm)
Top	62	52
Bottom	109	64

Findings

Bones

The first animal bone fragment was retrieved from the depth of 90cm. This bone fragment was present at the centre of the cist with the measurements of 30cm from north, 41cm from the east, 32cm from the south and 38cm from the west. At the bottom another animal bone fragments were traced at a depth of 134cm placed on the stone slab at the bottom of the cist. The bones were fragile possibly due to the stone disturbance observed continuously from the top.

Grave Goods

Offering Pot No.	Ceramic	Pot	Depth	Context	Description
1	RSRCSW	Pot	112 cm	Inside the cist	An intact red slipped russet-coated ware pot was found inside the cist, north to the chamber. The pot was placed inverted in the northeast corner with the rim facing downwards and slightly tilted towards southern side. The pot is closed mouth shape with everted round rim and pointed base. The texture of the pot is fine. Graffiti is observed near the rim of the sherd. The OP has an inner diameter of 8.8cm, outer diameter of 11cm, thickness of 0.9cm and height of 24.3cm.
2	RSW	Lid	122 cm	Inside the cist	A broken black slipped ware lid was traced inside the cist at a depth of 122cm. Lid was located in the southeastern side near the chamber and inverted. The OP has an inner diameter of 10.8cm, outer diameter of 13.7cm, thickness of 0.7cm and height of 2.7cm.

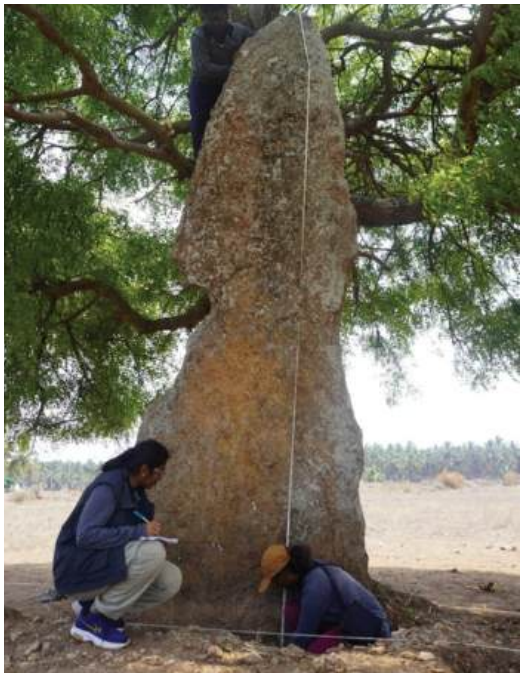

Fig. 6.25 Kongalnagaram: Menhir

Megalith - 6 (Menhir)

The circle with menhir is located on the eastern side of the village on the road leading to Udumalaipet and Pottayampalayam. This road is locally called as 17 road as bus number 17 to Udumalaipet goes through this road. The menhir is located east of this road. Nearest bus stands to this menhir are Kongalnagaram main bus stand, Kongalnagaram school bus stand and Pethampampatti bus stand. The menhir is surrounded by agricultural lands and coconut farms. It is some 100 meters away from the main road but it is visible enough to get noticed. A neem tree is grown alongside the menhir and it too is visible from the road.

The stone used for the menhir is of granite origin (Fig. 6.25). This stone is 450cm or 4.5m in height and 170cm in width. This stone is placed in the orientation facing southwest. The width of the stone is wide at the bottom and it gradually decreases going to the top. Damage due to weathering is noticed widely in most part of the menhir including sides.

Digging Area

The layout of 12 x 12m is made with the orientation of the menhir at its centre and a baulk of 1 meter is left from the menhir on all four sides. Digging is carried out only in the region west of the menhir. After reaching a depth of 45cm outer circle stones started to appear so the digging area was altered accordingly and later, according to the orientation of stone features observed digging area was further reduced into a quadrant of 4.20 x 4.20 meter.

Features

- At the depth of 35cm, stones were found in a cluster to the west of the menhir in eastwest orientation and it measures 194cm in length.
- Two outer circle orthostat stones were observed in northsouth to the menhir at a depth of 49cm and 56cm. The lengths of the stone on the south side is 113cm and the length of stone observed on the north side is 102cm.
- A small cist stone is observed at a depth of 40cm measuring 578cm on the northwestern side of the menhir.
- In the northwestern corner of 12 x 12m trench, an urn is observed at a depth of 44cm.
- At the depth of 108cm, a stone cluster is observed looking like a stone circle but it is incomplete, it measures 119cm in east–northwest orientation.

Pottery

No intact pots were retrieved from the menhir, except 2 broken ring stands found at a depth of 53cm, broken fragment potsherds were observed in clusters sporadically from most parts of the trench. The type of wares includes RW, RSW, BRW, BSW and RCPW.

Antiquity

Iron

Iron implements were found in large quantity and it is the most dominant antiquity. These iron implements were found sporadically in the area in front of the menhir. Most of these iron implements were found in fragmented and fragile

condition. The depths, measured in centimetres, range from 18cm to 323cm, with the count of antiquities varying between 1 and 5. The highest frequencies of iron objects are observed at depths of 233cm and 298cm, each with a count of 5 antiquities, indicating significant activity or preservation at these levels. Except for the knife and a fragmentary specimen that looks like an arrow-head, all the other iron objects are unintelligible.

Copper

Only one copper object is retrieved from the menhir. It is a miniature copper lid found at a depth of 186cm from the north-eastern quadrant.

Bone Fragments

Very few bone fragments were retrieved from the menhir. And all of them were found in a very fragile condition. All these bones appear to be of animal origin. Bone fragments were observed in these following depths – 148cm, 186cm, 290cm and 310cm.

Graffiti

Two graffiti sherds have been retrieved till date. One graffiti sherd is observed at a depth of 218cm and one at a depth of 262cm.

Megalith - 7 (Cairn Circle)

The cairn circle (Meg.-7), is present southwest of the menhir. The longest diameter of the mound is 8.04m measured from west to east. After photo documentation, cleaning, the layout is laid for a 5m radius and a baulk of 25cm. The first orthostat is traced on the eastern side at a depth 57cm and the second orthostat perpendicular to the eastern orthostat is traced on the southern side at a depth of 58cm, exposing inside the cist is not fully carried out because of the instability of the orthostats. Only the southern and eastern orthostat is found intact. The northern orthostat is appeared at a depth of 260cm. The western orthostat is missing or has not yet been exposed.

The diameter of the inner circle is 340cm and the diameter of the outer circle is 540cm. The distance between the northsouth orthostat at the bottom is 160cm. As of now the end depth of cairn circle inside the cist is 250cm.

Findings

A number of fragmented clusters of iron pieces, a few intact iron pieces are found. A broken copper rim and a few copper pieces were found. Potsherds of a significant quantity are found. No intact pot was found inside the cist and in the inner circle, this might be due to the falling of the stone slabs. The potsherds of RSW, BRW and RCPW were found throughout the cairn in all digs. Inside the cist from the depth of 200cm large sized potsherds of significant quantity were observed.

Bones

Significant quantities of small animal bones were found. These bones were broken and fragmented. The bones consist of long bones such as humerus, radius, femur, a few vertebrae, phalanges and unidentified bones.

Important findings from the Grave

Shell bangle

A shell bangle is found inside the cist burial (Meg 2) at a depth of 111.5cm in the northern chamber measuring 53cm from the northern wall, 25cm from the southern wall, 36cm from the eastern wall and 36cm from the western wall (Fig. 6.26). It is broken in condition but it could be mended into a single piece. It has an outer diameter of 4.6cm and inner diameter of 3.3cm with a thickness of 0.3cm and a weight is measured as 4.74 gm.

Fig. 6.26 Kongalnagaram: Shell bangle

Copper bowl

A copper bowl was found inside the offering pot no. 1 against the porthole of Megalith-4. Megalith-4 is a simple cist burial facing east, with a round porthole (Fig. 6.27). The copper bowl looks like a high-tin bronze bowl, but can be confirmed only when subjected to metallurgical analysis. A copper bowl was found within a fragmented russet-coated painted black-and-red ware (BRRCPW) pot, a pot notably graffitied on its shoulder. Curiously, the opening of copper bowl's opening is larger than the pot, making it challenging for the bowl to have been originally placed deep inside. A more plausible explanation is that the bowl was positioned at the rim of pot and subsequently fell in as the BRRCPW pot

sustained damage. The bowl measures 8.2cm in height, with a thickness of 0.7cm. Its mouth diameter is 11.6cm, the bottom diameter is 6.1cm and it weighs 415.56 grams. The BRRCPW pot containing the bowl had been kept on the floor slab. A skull is found on the south-eastern corner of the chamber, just behind that below the porthole an antimony rod is placed close to the pot containing the copper bowl. Human bones were also found close to the southern orthostat placed in a scattered manner. The available bones clearly suggest that it is a secondary burial.

Fig. 6.27 Kongalnagaram: Copper Bowl

Antimony rod

An antimony rod was unearthed from the cist burial (Meg.-4) at a depth of 91cm. It is found closer on the western side of the skull along with offering pots (Fig. 6.28). The length of the antimony rod is 13.6cm with a minimum breadth 0.3cm, a maximum breadth 0.4 cm and a weighs 7.05 grams. It is slightly bent with bulging ends on both sides. Antimony rod has been found in Harappan sites like Mohenjadaro, Harappa, Chanhudaro and Rakhigarhi and in many archaeological sites from Tamil Nadu like Keeladi. One of the significances about Kongalnagaram antimony rod is that it is found in burial context which could show the economic and social development of this region.

Fig. 6.28 Kongalnagaram: Antimony Rod

Graffiti – Burial offering pot

Russet-Coated Painted Pot

A fine specimen of russet-coated painted red slipped ware pot with relatively thin fabric, out-turned coiled rim, prominent neck and sagger / round base (Fig. 6.29). The painted pattern here makes one question on the pattern classification from fragmentary potsherds as it shows elaborated decoration that covers multiple categorised designs. The pattern here is like a flower with eight petals where each petal has three connected lines that outlines a leaf filled with dotted elements. It is surrounded by vertical row of lines and oblique running dots between the row of vertical lines. The brush stroke is even. All the lines observed to converge at the base of the pottery.

Fig. 6.29 Kongalnagaram: RCPW Pot from the grave

Scientific Investigations/ Documentation

During archaeological excavations at Kongalnagaram in Tamil Nadu, a diverse array of samples were collected for scientific investigation and documentation. These samples include archaeobotanical samples for pollen and phytolith analysis for understanding the environment, charcoal samples for AMS (Accelerator Mass Spectrometry) dating, soil samples for diatom study which enunciates the biodiversity of the site in ancient times. Bones samples at excavations provide insights into past human-animal interactions, including how animals were used for food, work or rituals and how they were treated. Pottery samples from each depth collected for understanding the provenance, mineral composition and manufacturing techniques. Archaeobotanical samples were also collected through flotation to understand macro and microbots. All are intended for comprehensive scientific analysis (Fig. 6. 30-6.34).

Fig. 6.30 Kongalnagaram: Dr. Satish Naik Collecting soil sample for archaeobotanical analysis

Fig. 6.31 Kongalnagaram: Wet sieve sampling process

Fig. 6.32 Kongalnagaram: On-site preliminary analysis of samples from wet sieve

Fig. 6.33 Kongalnagaram: Collection of Charcoal sample for AMS dating

Fig. 6.34 Kongalnagaram: Collection of soil samples from each layer for scientific analysis

Chronology

Carbon samples were carefully collected and sent for AMS dating in order to establish the absolute dating of the site Kongalnagaram. As of the present state of research from Kongalnagaram excavations, the habitation and burial can both be relatively dated based on the ceramic assemblage and other material culture unearthed in due course. The habitation clearly situated in Early Historical Period in the timeline confirmed with occurrences of Tamili inscribed potteries. From the abundant yield of russet-coated painted ware (RCPW) and other early historical pottery types like black-and-red ware (BRW), red slipped ware (RSW), black slipped ware (BSW) and red ware (RW), it is discernible that this culture is contemporaneous to Kodumanal which have been dated using absolute techniques. While the burial can be dated to Iron Age, the huge complex of burials at this site is based on analogy with other similar burials all across Tamil Nadu. However, to move beyond broad approximations and comprehend the earliest inhabitants of the region and establish a more precise chronology, particularly for

the megalithic burials in this region, the results from the ongoing absolute dating efforts will be crucial in refining and confirming the temporal sequence of the Kongalnagaram site.

Conclusion

Kongalnagaram site spanning a 20-acre habitation mound and a burial complex with cairn circles, menhir and cist burials, it lies along the ancient *Konga-p-peruvazhi* trade route connecting the Chera capital *Vanji* to Karur making it significant from its geographical position in the Kongu region, renowned for Iron Age and early historic settlements, with over 300 documented archaeological sites. Previous excavations at nearby sites like Kodumanal and Molapalayam revealed industrial activities, with AMS dates from Molapalayam indicating human activity as early as 1547–1562 BCE. The current excavations at Kongalnagaram aimed to establish chronology, trace script origins and understand cultural sequences.

The habitation excavations unearthed 1,389 artefacts across 14 trenches, dominated by terracotta (705 objects) and glass (284 objects), with hopscotch (571), beads (335) and iron objects (264) comprising 86% of the assemblage. Tamili-inscribed and graffiti-marked potsherds, alongside russet-coated painted ware (RCPW), black-and-red Ware (BRW) and red slipped ware (RSW); highlight cultural and linguistic significance. Artefact distribution peaks at shallow depths (e.g., trenches Z84 and AK68), suggesting intense early historic activity, with a decline in deeper layers indicating earlier, less dense occupation.

The burial excavations at the site comprising seven megalithic structures, revealed diverse funerary practices. Cist burials (Megaliths 1–5) yielded offering pots (e.g., 19 in Megalith-1), bones and grave goods like a shell bangle, copper bowl and antimony rod, suggesting complex rituals and trade connections. Secondary burial with of human remains of Megalithic-4 and a graffiti-inscribed RCPW pot underscores cultural sophistication. The menhir (Megalith-6) and cairn circle (Megalith-7) further diversify the burial landscape, with iron implements and fragmented pottery indicating robust material culture.

Currently, relative dating places the habitation in the Early Historic Period, contemporaneous with Kodumanal and the burials in the Iron Age, consistent with regional megalithic traditions. Ongoing AMS dating of charcoal samples may refine this chronology. The presence of Tamili inscriptions and graffiti links Kongalnagaram to the evolution of scripts, while artefact diversity suggests economic and social complexity tied to trade networks. The findings accentuate cultural settlement with significant potential for further research into chronology, ceramic and artefact distribution. Its quantitative analysis, script origins and socio-economic activities of the region, which are presently under study.

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Excavations at Porpanaikottai

T.Thangadurai

Introduction

Porpanaikottai (Lat. 10°22'47.62" N; Long. 78°52'32.08" E) is located in Veppangudi Panchayat, Alangudi taluk of the Pudukkottai district. It is located 7.5km east of Pudukkottai town, between the Manipallam road and Alangudi. It is one of the important archaeological sites of the Pudukkottai region.

Ponparapinapatti is the ancient name of this place and the present name is a corrupted form of Porpanaikottai. The site is known as Porpanaikkottai. Its Tamil meaning is *'Por-Pon'* meaning 'Gold', *'Panai'* meaning 'Palm tree' and *'Kottai'* meaning 'Fort', a fort with a golden palm tree. The local legend suggests the existence of a palm tree yielding golden fruits at the site. These golden fruits' wealth helped construct the Arangulanathar temple in Thiruvarangulam. The locals believed that the gold treasure still exists within the fortification.When we look at its design and the evidence, it appears that it must have been the ancient fort and hence the new town was named Pudukkottai in a later period.

Tamil-Brahmi Inscription and Hero Stone

T. Thangadurai, S. Pandiyan and A. Moses identified a Tamil Brahmi inscription in 2012 and S. Rajavelu deciphered it. The inscription is paleographically dated to the second or third century CE. This inscribed slab is triangular and refers to a hero or a military leader who recovers cattle from thieves. This inscription could be related to the military activities in this area. The text of this inscription is read as:

1. கோவென்கட்டிற்நெதிர
2. ணறுபொன்கொங்கர்விண்ணகோன்
3. ஆளறிஇத்துஏவஅதவ்வனரு
4. அங்கபடைத்தாணையன்கணங்
5. குமரன்கல்.

Transliteration

1. *kōveṉkaṭṭiṟnetira*
2. *ṇaṟuponkoṅkarviṇṇakōṉ*
3. *āeṟiittuēvaatavvaṉaru*
4. *aṇkapaṅaitatāṇaiyaṉkaṇaṅ*
5. *kumaraṉkal.*

This inscription says that *Pon-Kongar-Vinnakon,* who came next to *Kovankatti,* in his period, *Kanan-kumaran,* a leader of *Athavan,* sacrificed his life in the battle to recover cattle from thieves. So they erected a hero stone for his bravery and sacrifice. The word *Angapatai-Thanaiyan* means security chief of fort; moreover, *Angapadai* denotes it as one of the bodyguard militant forces. However, it is uncertain if the fortification can be dated to such an early period. A small mud fort might have been later expanded in subsequent period and reinforced with bricks.

Significant Architectural Features

The site has a citadel (palace), a moat around the citadel, a fortified brick wall and a tank. It is a well-planned site, suggesting the existence of an organized polity. The site is in an elevated location with laterite formations all around. The site has been chosen for its natural landscape and the resources.

Citadel Area

The citadel area is circular and located in the interior of the fort. It lies about 6ft from the inner surface of the fort. It perhaps had an extended, additional protection wall, observed in satellite imagery.

Moat

There were two moats in this Porpanaikottai Palace area. The inner moat near the mound (palace/citadel) measures 40m in width. The outer moat, outside the fort wall, is 7.5m in width. The soil quarried from the outer moat might be deposited on the rampart.

Fortification

The site has a roughly circular fort with a moat all around. The fort measures 532.26m in diameter. The fort was built of earth quarried from the area nearby. It has a mainly earthen core. Depending on the terrain, the fortification wall has a varying height of about 3m to 5m. The fortification has been reinforced with

bricks and laterite blocks at several localities to prevent soil erosion. On top of the fort is a wall constructed with laterite blocks and bricks. It is preserved at certain locations. It may have been built in the early medieval period, about 1000 years ago. However, it needs to be ascertained through scientific dating.

Brick Structure

The brick structure was found in various sizes during the excavation. The bricks were lined bricks and plain bricks. The various sizes of bricks are 34x19x6cm, 38x27x6cm, 34x24x6cm, 42x21x6cm and 36x21x6cm. These various sizes of bricks were made to construct a circular structure and the bricks were used according to the requirements.

Tank

A tank is found within the site and it is called *Vellavikulam.* It is located within the natural drainage and the accumulated water was used for the settlement. The tank suggests the existence of a settlement.

The fort covers an area of 11.88 acres. The habitation mound within the fort covers 3.11 acres. It had a continuous settlement from the time of the Iron Age. Black-and-red ware and early historic bricks were recovered from the Iron Age burials.

The earliest lithic evidence, in the form of a memorial stone dating back to the 3rd to 4th century CE, on paleographical grounds, emerged from this site. It looks contemporary to the Pulankuruchchi inscription. The memorial stone was raised for the hero *Kaṇankumaran,* an *angapaṭai-taṉaiyan* (a soldier of the close circuit), who died in a cattle raid carried out on this village by *Ponkongar Vinnakon.* The term kongar, generally used for the natives of *Konu-nāḍu,* is first mentioned in this inscription (Rajan et.al. 2023:41-53).

The ruined fort was probably built in the 13th-14th century CE. The village name Porpanaikottai, probably the corrupt form of *Ponparappinakottai,* as the *Ponparappinan* is the title of Bana chiefs and the fort might have been built during their reign (Venkatarama Ayyar 1944:971-972). There is another version of the name. *Ponpanai* or *Porpanai* is the original name of the village and later, the term kottai was added as a suffix after the construction of the fort. The circumference of the fort measures around 2.5km with a rampart area of 5.66 hectares and the fort covers an area of 17.75.66 hectares with three entrance gates (East, West and Northern sides). The northern side entrance gate has brick walls on both sides. The outer face of the fort is laid with three different types of bricks measuring 44x22x11cm, 42x21x10cm and 36x18x10cm and the top layer has laterite work.

It is a massive fort;the present size of the fort after fill-up measures 150x36m and according to tradition, it had 32 bastions. One could notice the remnants of the buildings, probably the chief's palace. There are temples of Munisvara and Karuppar at the four cardinal points.

A habitation mound is found in and around a tank, namely *Niralikuḷam,* which lies inside the fort. It yielded a large number of potsherds, such as black-and-red ware, red ware and black ware. A few potsherds bearing graffiti marks and Tamil-Brahmi letters are also found. Besides, beads of glass, semi-precious stone and terracotta, glass bangles, a few iron ore and slag are present at the mound. An iron slag mound lies on the southern side near the fort. Iron pieces, full-size and broken parts of terracotta pipes (tuyeres), iron ore and iron slag are found on the mound and two other iron slag mounds are found with the same feature on the northeast corner near the fort, which is locally called *Karimeḍu.* A few different types of pits, both circular and oval-shaped pits and black-and-red ware, red ware and black ware potsherds are found on the laterite rock surface on the northern side near the fort.

Objectives

The main objectives of the excavation are as follow,

- To identify the extent of the habitation mound and the fort at Porpanaikottai
- To understand the ancient Fort and its installations.
- To estimate the emergence and disuse of the ancient Fort
- To determine the earliest settlement of this region
- To know more about the culture, ceramics and settlement of this region

Previous Excavations

The previous excavation was conducted in the year 2021 by Dr. Iniyan of Tamil Nadu Open University. He met various potsherds engraved with graffiti marks, brick channels, tamil-brahmi inscribed potsherds, conch, iron pieces, painted potteries, beads, game pieces, shell bangles, bone tools and hopscotches from the Porpanaikottai fortification area. In 2022, the Tamil Nadu State Department of Archaeology conducted an Excavation in this area. They learned about the circular brick structure, Tamil brahmi inscribed pot sherds and many antiquities.

The excavation was carried out on a large-scale grid plan with trench measurements of 5x5m in the site on the mound region of Porpanaikottai.

Past excavation was carried out in the Porpanaikottai area of 11.88 acres and the excavated area of the Mound (Citadel/Palace) area is 3.11 acres. Excavation at this site started on 22.05.2023. A total of 22 trenches have been excavated in and around the Porpanaikottai in two localities. Locality 1 trenches A1, ZB1, D2, H2,C1, B1, P3, ZL5, P4, ZA1, YA1, P5, ZA2, YA17 and XA1 are laid inside the exterior wall of the palace area. Locality 2 trenches YS50, YS49, YS48, YS47, YS46, YS45 and YT51 are laid inside and outside the exterior wall. Habitation settlements with fortified brick wall structures were commonly noticed at this site. The further details of the excavation are as follow,

The Phase I excavation was carried out in the Mound (citadel/palace) area (Locality 1) and the Fortification wall (Locality 2). Habitation settlements with fortified brick wall structures were commonly noticed at this site. The excavation in locality 1 in the mound area of the Porpanaikottai yielded a circular brick structure, channels, brick patches, flooring tiles, ovens, post holes and the exterior wall of the mound. During the excavation, a large fortification wall was traced from locality 2. This further led to tracing the interior area of the fortification wall and brick structures of the Palace area which might belong tothe elite (noble) people. The interior moat of the external wall and more iron smelting area around the mound (place) were traced during the excavation.

Locality 1 of trench A1, XA1, YA1, ZA1 had a circular brick structure and brick patches at a depth of 25cm (Fig. 7.1). The trench ZB1 had roof tiles at a depth of 46cm and a brick channel at a depth of 50cm. YA1 and ZA1 had a brick channel at a depth of 50cm. The trench ZA2 had a brick structure and patches around the trench. The other trenches of C1 and D2 had brick patches around the trench. Trench B1 had a brick structure, a post hole, an insitu pot, a bone point, a carnelian and beads. The trench H2 had two complete bricks at 50cm, a golden nose stud at a depth of 133cm and ovens at various depths of 200cm and 236cm. The trenches P3 and P4 had an exterior brick wall of the mound (palace) anda few brick patches were noticed in trench P5. The trench ZL5 had brick patches, an oven and post holes. The trench YA17 had evidence of a deep cut in the soil, dug in the west section for the moat.

The Locality 2 of trench YS50, YS49, YS48, YS47, YS46, YS45 and YT51 are laid inside and outside the exterior wall. The primary purpose of the trench is to determine the structure of the bastion and its depth in the exterior palace wall.

Fig. 7.1 Porpanaikottai: Locality 1

Fig. 7.2 Porpanaikottai: Locality 2

Present Excavation

The archaeological site of Porpanaikottai has a historical past with special reference to the mound (Citadel/Palace), moat and fortified brick wall structure. The excavation was carried out on a large-scale grid plan with trench measurements of 5x5m in the site on the mound region of Porpanaikottai.

The present excavation was carried out in the Porpanaikottai area of 11.88 acres. Excavation at this site started on 22.05.2023. A total of seventeen trenches have been excavated in and around the Porpanaikottai in three localities. Locality 1 trenches A20, A22, B21, B22, C20, C21, C22, F27 and G27 are laid in the exterior place of the palace area. Locality 2 trench ZR21 is laid near the inner moat of the palace area. Locality 3 trenches are (YA32, YB31, YC31, YC30, YDD29, YFF27 and YHH13) near to the outer wall. Habitation settlements with brick structures and fortified brick walls were commonly noticed at this site. The further details of the excavation are as follows.

The present excavation was carried out inside the fort near the palace area, the inner palace area andthe outer wall in three different localities. Habitation settlements with brick structures and fortified brick walls were commonly noticed at this site. The excavation in locality 1 in the lower area of the Porpanaikottai palace complex revealed a circular structure. During the present excavation, something new was traced from locality 2. Some new ceramic types and settlement patterns were identified in Locality 3.

The Locality 1 of trench A20, A22, B21, B22, C20, C21, C22, G27 and F27 was laid. Locality 2 of trench ZR21 was laid outside the inner moat area. Locality 3 of trench YA32, YD31, YC31, YC30, YDD29, YFF29 and YHH13 lies on the nearby slope area of the outer wall.

Ceramics

The unearthed pottery collection includes black-and-red ware, black ware, red ware, red slipped ware, glazed ware, tarpedo jar, buff ware, rouletted ware and imitation ware.

Antiquities

The collection of unearthened antiquities includes beads (glass, agate, bone, carnelian, crystal quartz, soap stone, terracotta), glass bangle, antimony, bone point, alloy coin, gamesmen, copper rod, hopscotches, unidentified gold objects, ear ornaments, ivory dice, lamp, rubbing stone, iron nail, spindle whorl, spout, TC figurines, unidentified objects (iron, copper, terracotta), base stone, weight stone, ring stone and stone objects.

Cultural Sequence

Based on the layers, potteries and antiquities, the cultural habitation may be categorized into

- Period I: 13th Century CE – 17th Century CE (Layer 1)
- Period II: Medieval Period (Layer 2)
- Period III: Early Historic Period (Layer 3)

All findings collected from the excavation were stored in ziplock bags after cataloguing, indexing, digital documenting and photography; they were stored in suitable containers. soil, seed and charcoal samples were collected for future dating. Also, it is planned to display the excavated antiquities at the proposed site museums with proper scientific preservation.

Site Settings

Around Porpanaikottai, there were two burial sites situated. One was in the southeast direction, around 5km from Porpanaikottai and the other was in the west, nearly 4km from Porapanaikottai. Both are burial grounds; the first site was situated in Vamban, located in the Alangudi taluk, Pudukkottai district. The other one was Kalasamangalam, situated near Thirukattalai in the taluk of Pudukkottai.

Vamban

Vamban is located in the Taluk of Alangudi in Pudukkottai district, where a pond named Kaniyan Kulam is located,on the left of the Pudukkottai Alangudi main road. In this pond, some stone circles were noticed (Fig. 7.3). Most of them were damaged by the local people for Agricultural purposes and to strengthen the pond's bank. These stone circles were full of Laterite stones, one of which is square in shape and the biggest among all the circles. Nearly eight stone circles were identified in proper alignment. This burial ground was located near the birthplace of the Ambuli River, one of the major tributaries of the Pudukottai district.

Kalasamangalam

Kalasamangalam is located near Thirukattalai in the Pudukkottai district. This was one of the burial grounds of Megalithics in Pudukkottai. Stone circles, cists, capstones and urn burials were noticed here. K. Venkadarangam Raju, former curator of the Pudukkottai museum, mentioned this as a large burial ground with nearly 500 burials. This burial was also mentioned in the book "Manual state of Pudukkottai". This burial ground was fenced and maintained by the Archaeological Survey of India. Many burials were disturbed by the local people.

Fig. 7.3 Vamban:Stone circle and cairn circle

Archaeological settings in and around Porpanaikkottai					
S.no	**Site**	**Geo coordinates**	**Distance from the excavation site**	**Cultural period**	**Cultural remains**
1.	Vamban	10° 22' 21" N 78° 55'13.61" E	5 km	Megalithic	Stone circle, Cairn circle, and Iron slags
2.	Kalasamangalam	10° 22'22.01" N 78° 50'30.53" E	4 km	Megalithic	Stone circle, Cist burial, Capstone and Urn burials

Trench Report

Locality -1

A20

This trench started on17/08/24. This trench was laid to see the continuity of the ramped floor found in the trenches B21,B22 and C22. However, no floor was found in this trench, but many brick bats were found in every dig after a depth of 20cm. The composition of the soil was moderate and semi-moderate. Brick bats, bone fragments and iron slags were also found. Potteries like red ware, red slipped ware and a few pieces of black-and-red ware were found. Storage jar pieces, glazed ware androof tiles were also found. Antiquities like glass beads, carnelian beads, gamesman, hopscotch and TC figurines were found in this trench (Fig. 1.4).The trench was stopped at a depth of 59 cm due to brick clusters.

Fig. 7.4 Porpanaikottai: TC figurine in A20

A22

This trench was started at a depth of cm on 15/07/24. A Trench was laid to see the continuity of the Ramped floor found in the trenches B21, B22 and C22. But in this trench, no floor was found. At a depth of 28cm, a small structure like a channel was found, but its continuity was missing on both sides (Fig. 1.5). Laterite stones and oven pieces were found. The composition of the soil was moderate and semi-moderate. Brick bats were found along with bone fragments and iron slags were also found. Potteries like black-and-red ware, red slipped ware and a few pieces of black ware were found. Antiquities like glass beads, glass bangles, soapstone beads, hopscotches, unidentified iron objects, gamesmen, unidentified copper objects, carnelian beads, bone beads, copper nails and copper coins were found.

Fig. 7.5 Porpanaikottai: Trench A22

B21

This trench had a ramped brick floor at a depth of 15cm. This floor was made with finely crushed bricks and pebbles. The soil texture was moderate, semi-moderate and loose in some places. Brick bats, iron slags and bone fragments were found. laterite stone was found on all sides of the trench.

An oven was found in the south section side at a depth of 83cm. Another small oven was noticed in the north section at a depth of 107cm along with post holes (Fig. 1.6). Another oven was found in a large area in the north-west side at a depth of 225cm. Potteries like black-and-red ware, red slipped ware and a few pieces of black ware were found. antiquities like glass beads, glass bangles, soapstone beads, hopscotches, unidentified iron objects, unidentified copper objects, carnelian beads, amethyst beads and a tiny piece of unidentified gold were found.

Fig. 7.6 Porpanaikottai: TrenchB21

B22

This trench was laid to identify the expansion of the ramped floor in trench B21. A ramped floor was noticed at a depth of 13cm and is spread all over the Trench (Fig. 1.7). This floor was made with finely crushed bricks and pebbles. The texture of the soil was moderate. Potteries like red ware and red slipped ware were found, along with a few pieces of black-and-red ware. antiquities like glass beads, hopscotch, soapstone beads, carnelian beads, crystal beads, iron nails and a tiny piece of unidentified gold were found. This trench was stopped at a depth of 30 cm due to the floor activity.

Fig. 7.7 Porpanaikottai: Trench B22

C20

The texture of the soil was moderate, semi-moderate and loose. Brick bats, iron slags and bone fragments were found. Laterite stone was found on all sides of the trench. Pits were identified in this trench. At a depth of 110cm, oven pieces were found. Ashy patches and post holes were identified on the sections. Rice husk and grains were found at a depth of 114cm. 5 post holes were found at a depth of 206cm,which seems like a crescentshape (Fig. 1.8). Charcoal and rice husk samples were collected. Potteries like black-and-red ware, red slipped ware, red ware and black ware were found, along with this type of glazed ware and torpedo jars in this trench. shapes like pot, bowl, lid, miniature pot and bowl were found.Three pits were not noticed

Fig. 7.8 Porpanaikottai: Trench C20

in this trench. Antiquities like glass beads, glass bangles, hopscotch, soapstone beads, carnelian beads, crystal beads, rubbing stone, muller, amethyst beads, earlobes, agate beads, iron knives, sling balls, spindle whorls, conch beads and iron nails were found.

C21

The texture of the soil was moderate, semi-moderate and loose. Bats, iron slags and bone fragments were found. Laterite stone was found on all sides of the trench. Pits were identified in this trench. Ashy patches and post holes were identified on the sections. At a depth of 164cm, an oven was identified on the south section (Fig. 1.9). Charcoal samples were collected.Potteries like black-and-red ware, red slipped ware, red ware andblack ware were found, along with this type of glazed ware and torpedo jars in this trench. Shapes like pot, bowl, lid, miniature pot and bowl were found in this trench. Antiquities like glass beads, glass bangles, hopscotch, soapstone bead, carnelian bead, crystal bead, rubbing stone, gamesman, copper nail, muller, amethyst bead, agate bead, iron knife, sling ball, spindle whorl, conch bead and iron nail were found.

Fig. 7.9 Porpanaikottai: Trench C21

C22

This trench was laid to identify the expansion of the ramped floor in trench B21. A ramped floor was noticed at a depth of 16cm and is spread all over the trench (Fig. 7.10). This floor was made with finely crushed bricks and pebbles.

The texture of the soil was moderate. potteries like red ware and red slipped ware were found, along with a few pieces of black-and-red ware. Antiquities like glass beads, hopscotch, soapstone beads, carnelian beads, crystal beads, iron nails, quartz beads and copper coins were found.

Fig. 7.10 Porpanaikottai: Trench C22

G27

The texture of the trench was moderate and semi-moderate. Brick bats, iron slags and bone fragments were found. At a depth of 13cm, a pottery cluster was noticed on the west section (Fig. 7.11). It may be a dump. A muller was found at a depth of 38cm, a rubbing stone was found near the south section and some pottery clusters were found on the northeast corner. Potteries like red ware and red slipped ware were found, along

Fig. 7.11 Porpanaikottai: Trench G27

with a Few pieces of black-and-red ware. Antiquities like glass beads, TC wheels, unidentified iron objects, iron nails, hopscotch, gamesman, quartz beads and copper antimony rods were found. This trench was stopped at a depth of 38cm for the exposure of the subject.

F27

The texture of the trench was moderate and semi-moderate. Brick bats, iron slags and bone fragments were found. At a depth of 20cm, a small brick line was noticed (Fig. 7.12). Potteries like red ware and red slipped ware were found, along with a few pieces of black-and-red ware. antiquities like glass beads, TC wheels, unidentified iron objects, iron nails, hopscotch, gamesman, quartz beads, copper nails and copper antimony rods were found. This trench was stopped at a depth of 40 cm for the subject exposure.

Fig. 7.12 Porpanaikottai: Trench F27

Locality – 2

ZR21

The texture of the soil was moderate, semi-moderate and loose. Brick bats, iron slags and bone fragments were found. Laterite stone was found on all sides of the trench. Pits were identified in this trench; charcoal samples were collected. Potteries like black-and-red ware, red slipped ware, red ware and black ware were found, along with this type of glazedware, which was also found in this trench. Shapes like pot, bowl, lid, miniature pot and bowl were found.Two pits

were noticed in this trench, one on the east and the other on the north sections. Antiquities like glass beads, glass bangles, tc wheel, hopscotch, soapstone bead, carnelian bead, crystal bead, rubbing stone, muller, amethyst bead, agate bead, iron knife, sling ball, spindle whorl, iron chisel and iron nail were found (Fig. 7.13).

Fig. 7.13 Porpanaikottai: Trench ZR21

Locality – 3

YA32

This trench was laid to find the settlement on the side of the outer corridor wall. So trenches were laid near the outer wall. The texture of the soil was moderate, semi-moderate and loose. Brick bats, iron slags and bone fragments were found. laterite stone in small sizes was found on all sides of the trench. Potteries like black-and-red ware, red slipped ware, red ware and black ware were found, along with this type, buff ware was also found in this trench. Shapes like pot, bowl, lid, miniature pot and bowl were found.Pottery clusters were found in the east and north sections. Antiquities like glass beads, glass bangles, gamesman, antimony rod, hopscotch, soapstone bead, quartz bead andiron nail were found.

YB31

This trench was laid to determine the continuity of trench YA32. The texture of the soil was moderate, semi-moderate and loose. Brick bats, along with bone fragments, were found. laterite stone in small sizes was found on all sides of the trench. Potteries like black-and-red ware, red slipped ware, red ware and black ware were found, along with this type, buff ware was also found in this trench. Shapes like pot, bowl, lid, miniature pot, storage pot and bowl were found. A charcoal sample was collected in this trench. Pottery clusters were found in the north and east sections. Antiquities like glass beads, glass bangles, a sling ball, an agate bead, a hopscotch, a soapstone bead, a bone bead, a quartz bead, an ivory dice and an iron nail were found. Two pits were found in this trench, one in the eastern section and the other in the southern section.

YC31

This trench was laid to determine the continuity of trench YC30. The texture of the soil was moderate, semi-moderate and loose. Brick bats, along with bone fragments, were found. laterite stone in small sizes was found on all sides of the trench. At a depth of 160cm, a Tamili inscribed pot sherd was found. At a depth of 156cm, a small oven was found in the east section; charcoal samples were collected from it. Potteries like black-and-red ware, red slipped ware, red ware andblack ware were found, along with this type, buff ware was also found in this trench. Shapes like pot, bowl, lid, miniature pot, storage pot and bowl were found. A charcoal sample was collected in this trench. Pottery clusters were found in the north and east sections. Antiquities like glass beads, glass bangles, hopscotch, soapstone beads, bone beads, quartz beads and iron nails were found. On the east side, baulk was removed to trace the oven.

YC30

This trench was laid to determine the continuity of trench YB31. The texture of the soil was moderate, semi-moderate and loose. At a depth of 20cm, a small brick structure was found. It was square in size and had five courses of bricks. Bricks are not the same size and are not correctly aligned. Potteries like black-and-red ware, red slipped ware, red ware and black ware (a few pieces) were found in this trench. shapes like pot, bowl, lid, miniature pot, storage pot and bowl were found. Antiquities like glass beads, hopscotch, gamesmen and soapstone beads were also found. The north side of the baulk was removed to trace the continuity of the square-sized brick structure (Fig. 7.14).

Fig. 7.14 Porpanaikottai: Trench YA32, YB31, YC31 and YC30

YFF29

This trench was laid out to find out the settlement pattern on the slope side of the area. The soil was moderate and semi-moderate in texture. Brick bats and laterite were found along with bone fragments. Potteries like black-and-red ware, red slipped ware, red ware and black ware (a few pieces) were found in this trench. Shapes like pot, bowl, lid, miniature pot, storage pot and bowl were found. Antiquities such as glass beads, hopscotch, iron nails and a polished hand axe in broken condition were found (Fig. 7.15).

Fig. 7.15 Porpanaikottai: Trench YFF29

YDD29

This trench was laid out to determine the continuity of the trench YFF29. The soil was moderate and semi-moderate in texture. Brick bats and laterite were found along with Bone fragments. Potteries like black-and-red ware, red slipped ware and red ware were found in this trench. Shapes like pot, bowl, lid, miniature pot, storage pot and bowl were found. antiquities such as glass beads, glass bangles, soapstone beads, copper antimony rod, hopscotch and copper coin were found (Fig. 7.16).

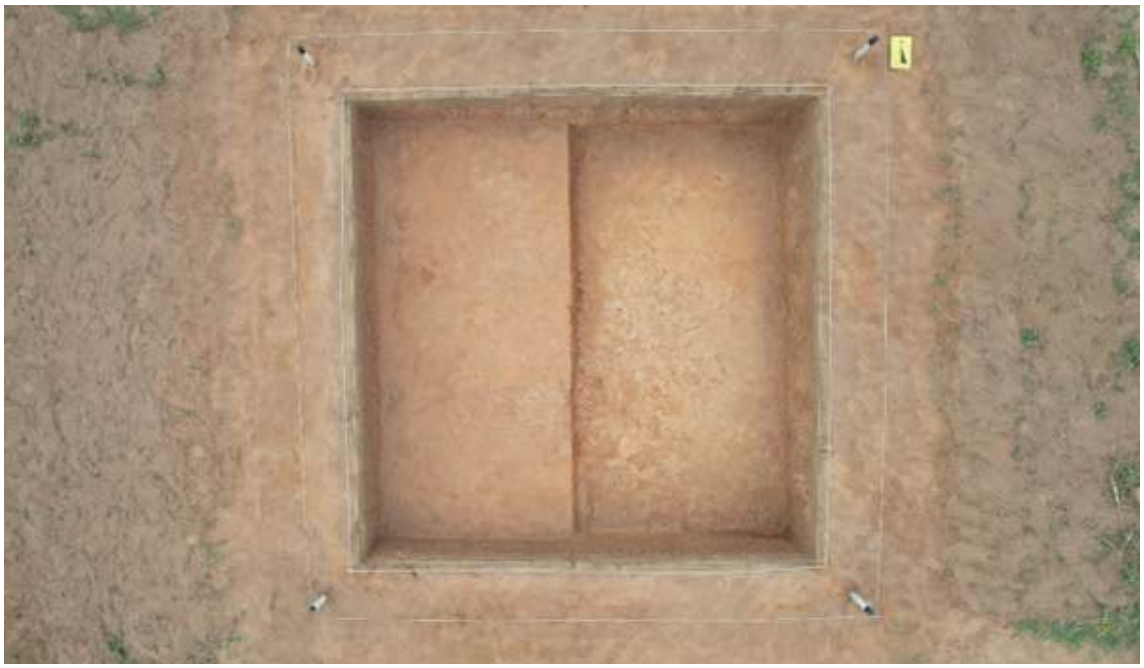


Fig. 7.16 Porpanaikottai: Trench YDD29

YHH13

This trench was laid out to find the settlement pattern on the slope side of the area and on the west side of the area. The soil was moderate and semi-moderate in texture. Brick bats and laterite were found along with bone fragments. Potteries like black-and-red ware, red slipped ware, red ware and black ware (a few pieces) were found in this trench. Shapes like pot, bowl, lid, miniature pot, storage pot and bowl were found. A Tamili inscribed sherd was also found in this trench. Antiquities such as glass beads, glass bangles, soapstone beads, carnelian beads, a dagger, a hopscotch and a TC wheel were found. unidentified iron and copper objects were found. lime and ashy patches were found in this trench (Fig. 7.17).

Fig. 7.17 Porpanaikottai: Trench YHH13

Fig. 7.18 Porpanaikottai: Pot in C20

Fig. 7.19 Porpanaikottai: Beads and Bangle Pieces

Fig. 7.20 Porpanaikottai: Bone Point, Ivory Dice and Bone Pendant

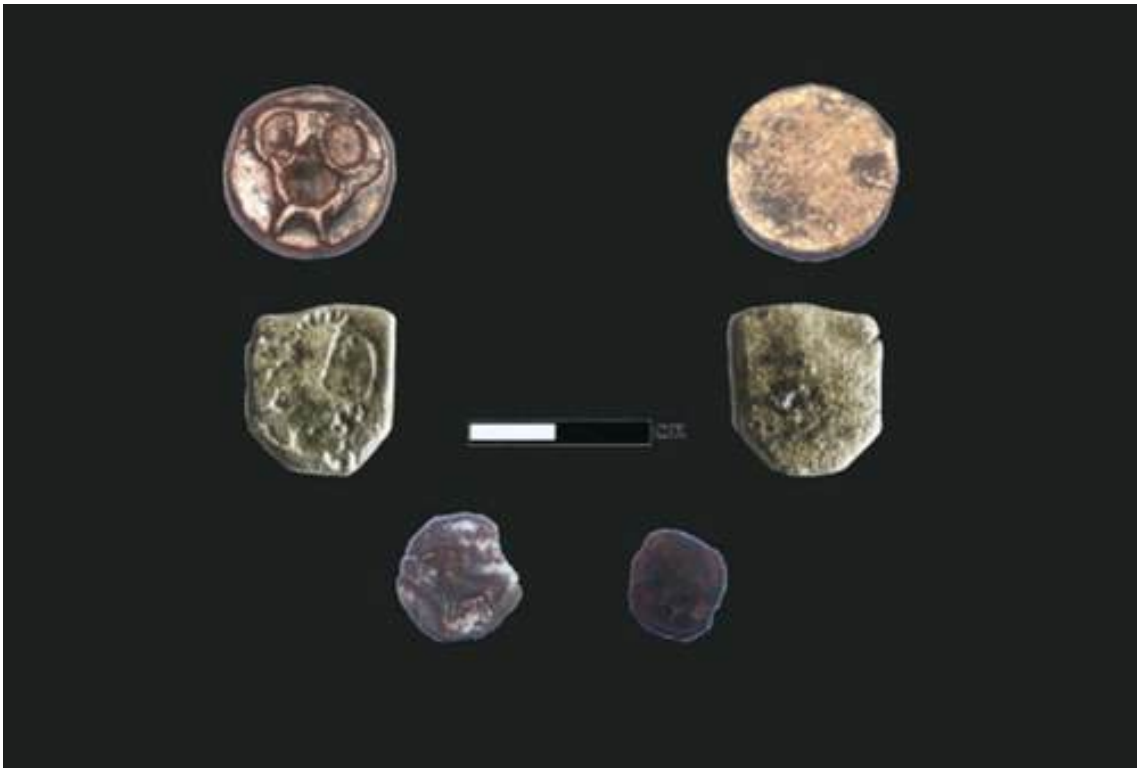


Fig. 7.21 Porpanaikottai: Copper coins and Copper nails

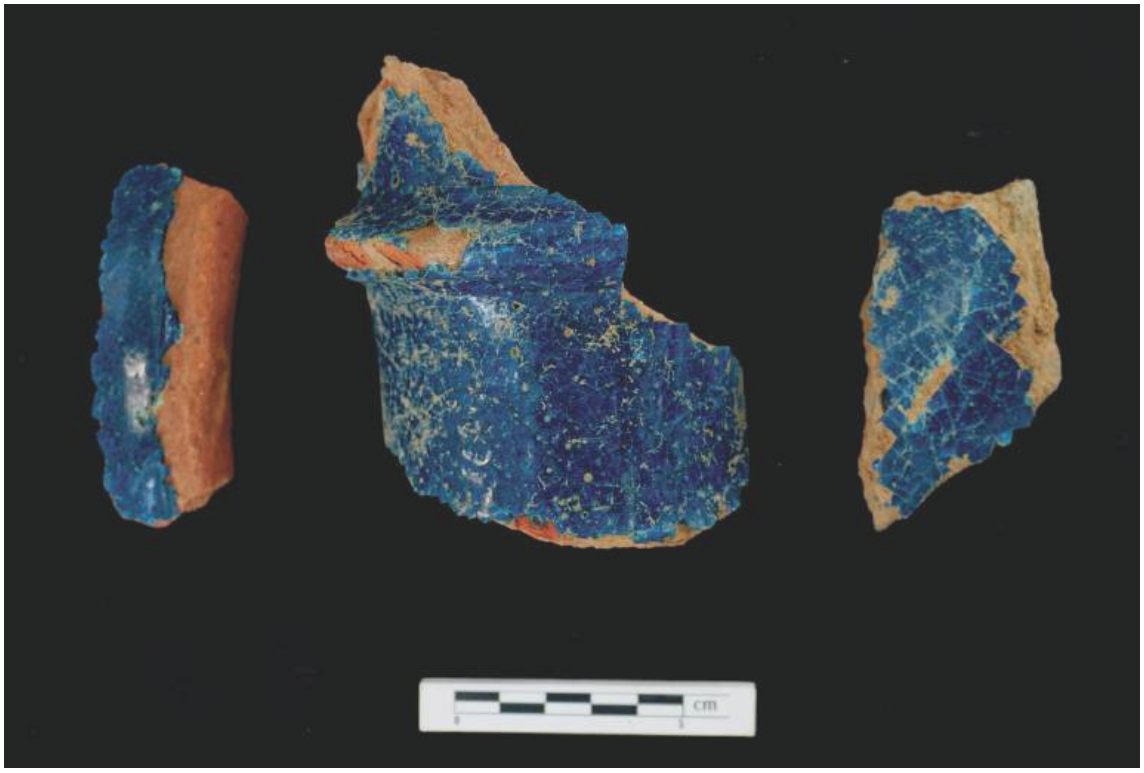


Fig. 7.22 Porpanaikottai: Glazed ware

Fig. 7.23 Porpanaikottai: Brick structure in C30 and Oven in C31

Fig. 7.24 Porpanaikottai: Copper Antimony rod

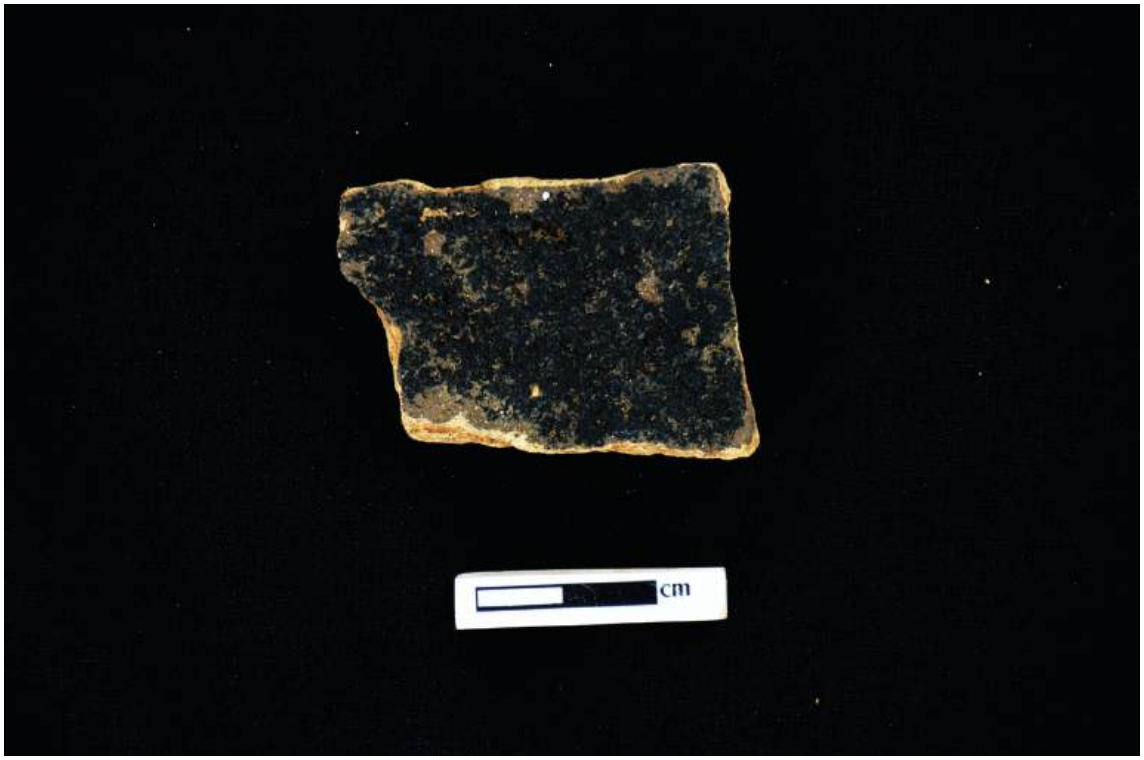


Fig. 7.25 Porpanaikottai:Tarpedo Jar

Fig. 7.26 Porpanaikottai: Buff ware

Fig. 7.27 Porpanaikottai: Graffiti

Fig. 7.28 Porpanaikottai: Ear ornament

Fig. 7.29 Porpanaikottai: Iron Nails

Fig. 7.30 Porpanaikottai: Tamili inscribed sherd

Fig. 7.31 Porpnaikottai: TC objects

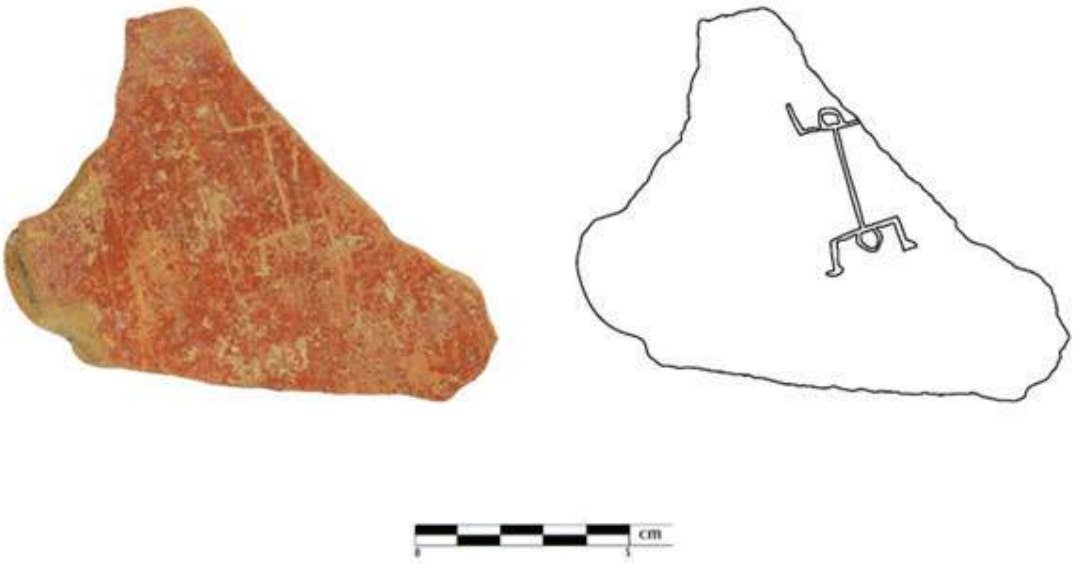
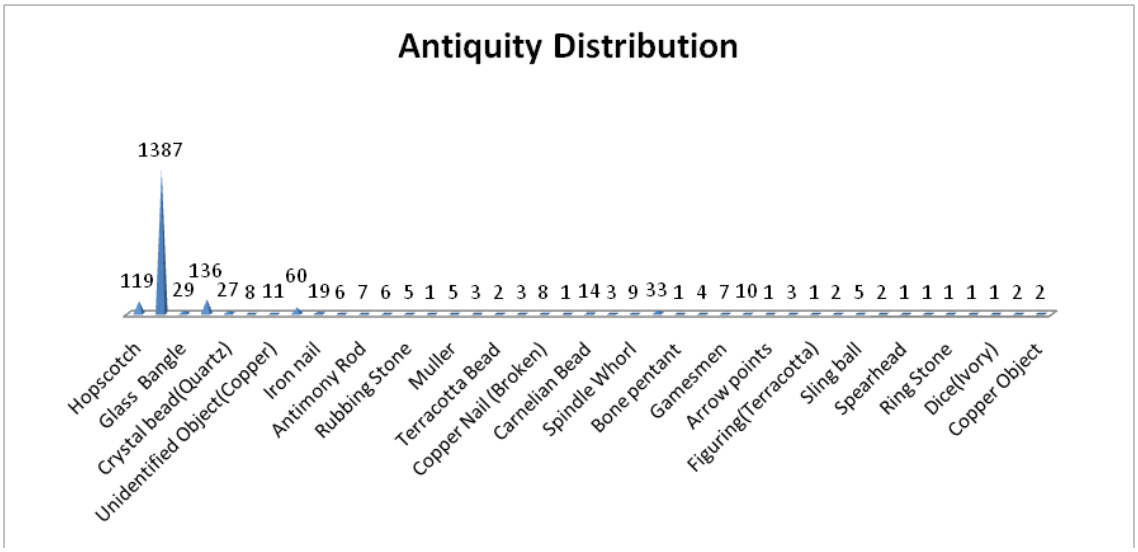


Fig. 7.32 Porpanaikottai: Human figurine

Porpanaikottai Excavation - Phase- II
Antiquities list

S.No	Material	Total Number of Antiquities
1	Hopscotch	119
2	Glass Bead	1387
3	Glass Bangle	29
4	SoapstoneBead	136
5	Crystal Bead (Quartz)	27
6	Unidentified Object (TC)	8
7	Unidentified Object (Copper)	11
8	Unidentified Object (iron)	60
9	Iron Nail	19
10	Terracotta Wheel	6
11	Antimony Rod	7
12	Coin (Copper)	6
13	Rubbing Stone	5
14	Grinding Stone	1
15	Muller	5
16	Amethyst Bead	3
17	Terracotta Bead	2
18	Unidentified Object (glass)	3
19	Copper Nail (Broken)	8
20	Ear Ornament	1

S.No	Material	Total Number of Antiquities
21	Carnelian Bead	14
22	Agate Bead	3
23	Spindle Whorl	9
24	Bone Bead	33
25	Bone Pendant	1
26	Unidentified Object (Gold)	4
27	Gamesman	7
28	Bone Points	10
29	Arrow Point	1
30	Ivory Bead	3
31	Figurine (Terracotta)	1
32	Knife	2
33	Sling Ball	5
34	Conch Bead	2
35	Spearhead	1
36	Polished Hand Axe	1
37	Ring Stone	1
38	Chisel	1
39	Dice(Ivory)	1
40	Dagger	2
41	Copper Object	2
Total		**1982**



Layer Description

S.No.	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	YHH13	Humus	0-19 cm	Pale brown	Sandy silt	Red ware, black-and-red ware and red slipped ware and soapstone beads
2.	YHH13	1	19-132 cm	Pale brown to light yellowish brown	Semi compact	Red ware, black-and-red ware, red slipped ware and black ware, brick bats, hopscotches, unidentified iron objects, carnelian beads, tc wheel and dagger.
3.	YHH13	2	131-223 cm	Brown	loose	Red ware, black-and-red ware, red slipped ware, black ware, un-identified copper object, unidentified iron object and dagger.
4.	YHH13	NS	223 cm	-	-	-

S.No.	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	YFF29	Humus	0-18 cm	Light brown	Sandy silt	Red ware and red slipped ware
2.	YFF29	1	18-97 cm	light brown to light Reddish brown	compact	Red ware, black-and-red ware, red slipped ware and black ware, brick bats, hopscotches and iron nails.
3.	YFF29	NS	98cm	-	-	-

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	YDD29	Humus	0-22 cm	Light brown	Sandy silt	Red ware and red slipped ware
2.	YDD29	1	22- 97 cm	Light brown to light red-dish brown	compact	Red ware, black-and-red ware, red slipped ware and black ware, brick bats, hopscotches, copper coin and copper antimony rod.
3.	YDD29	NS	97 cm	-	-	-

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	YA32	Humus	0-19 cm	Pale brown	Sandy silt	Red ware, black-and-red ware and red slipped ware.
2.	YA32	1	19-107 cm	Pale brown to light yellowish brown	Semi compact	Red ware, black-and-red ware and red slipped ware. brick bats, hopscotches, unidentified iron objects, quartz bead, antimony rod and gamesman.
3.	YA32	2	107-172 cm	Light or-ange brown	Semi compact	Red ware, black-and-red ware, red slipped ware, black ware, buff ware, hopscotch and bone bead.
4.	YA32	NS	173 cm	-	-	-

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	YB31	Humus	0-15 cm	Pale brown	Sandy silt	Red ware, black-and-red ware and red slipped ware.
2.	YB31	1	15-55 cm	Pale brown to light yellowish brown	Semi compact	Red ware, black-and-red ware and red slipped ware: brick bats, hopscotches, unidentified iron objects, quartz bead and unidentified TC.
3.	YB31	2	55-132 cm	Light orange brown	Semi-compact and compact	Red ware, black-and-red ware, red slipped ware, black ware, buff ware, hopscotch, antimony rod, TC wheel, agate bead and ivory dice.
4.	YB31	Pit 1	88–184 cm	-	loose	red ware, black-and-red ware, red slipped ware and black ware.
5.	YB31	Pit 1	59-182cm	-	loose	Red ware, black-and-red ware, red slipped ware and black ware.
6.	YB31	NS	132cm	-	-	-

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	YC31	Humus	0-12 cm	Pale brown	Loose	Red ware and red-slipped ware.

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
2.	YC31	1	12-54 cm	Pale brown to light yellowish brown	Semi compact	Red ware, black-and-red ware and red slipped ware: brick bats, hopscotches, unidentified iron objects and quartz bead.
3.	YC31	2	54-148 cm	Light orange brown	Semi compact and compact	Red ware, black-and-red ware, red slipped ware, black ware, tamilbrahmi sherd, hopscotch, bone bead, iron knife, spindle whorl and unidentified copper.
4.	YC31	NS	149 cm	-	-	-

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	YC30	Humus	0-13 cm	Pale brown	Loose	Red ware and red-slipped ware.
2.	YC30	1	13-51cm	Pale brown to light yellowish brown	Semi compact	Red ware, black-and-red ware and red slipped ware. brick bats, hopscotches, quartz bead and gamesman

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	ZR21	Humus	0-18 cm	Pale brown	Loose	Red ware, red slipped ware, glass beads and bangles

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
2.	ZR21	1	18-118 cm	Pale brown to light yellowish brown	compact	Red ware, black-and-red ware and red slipped ware. brick bats, hopscotches, tc wheel, spindle whorl, iron nail and iron chisel.
3.	ZR21	2	118-173 cm	Brown	Semi compact	Red ware, black-and-red ware, red slipped ware, black ware and hopscotch
4.	ZR21	NS	174cm	-	-	-

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	B22	Humus	0-13 cm	Light yellowish brown	Loose	Red ware, red slipped ware, hopscotch, carnelian bead and soapstone bead.
2.	B22	1	13-30cm	Light brown	Semi compact	Red ware, black-and-red ware and red slipped ware. brick bats, hopscotches, quartz bead, iron nails and an unidentified tiny gold object.

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	C22	Humus	0-14 cm	Light yellowish brown	Loose	Red ware and red slipped ware, hopscotch and soap-stone bead

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
2.	C22	1	14-35cm	Light brown	Semi compact	Red ware, black-and-red ware and red slipped ware. brick bats, hopscotches, quartz bead, iron nails and copper coins.

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	G27	Humus	0-11 cm	Pale brown	Sandy silt	Red ware, red slipped ware, black-and-red ware, TC wheel and unidentified iron objects.
2.	G27	1	11-38cm	Light brown	compact	Red ware, black-and-red ware and red slipped ware. brick bats, hopscotches, quartz bead, iron nail, gamesman, antimony rod, muller and rubbing stone.

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	F27	Humus	0-9cm	Pale brown	Sandy silt	Red ware and red slipped ware and hopscotch.
2.	F27	1	10-40cm	Light brown	Compact	Red ware, black-and-red ware and red slipped ware. brick bats, hopscotches, quartz bead, iron nails, copper nails and antimony rod.

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	A22	Humus	0-12cm	Pale brown	Sandy silt	Red ware and red slipped ware, hopscotch and unidentified iron objects.
2.	A22	1	13-116 cm	Light brown	Compact	Red ware, black-and-red ware and red slipped ware, brick bats, hopscotches, quartz bead, copper nails, gamesman and copper coin.

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	A20	Humus	0-13cm	Pale brown	Sandy silt	Red ware and Red slipped ware, Hopscotch.
2.	A20	1	14-59 cm	Light brown	Com-pact	Red ware, black-and-red ware and red slipped ware. brick bats, hopscotches and TC figurine.

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	B21	Humus	0-17 cm	Pale brown	Sandy silt	Red ware, black-and-red ware, red slipped ware and hopscotch.
2.	B21	1	18-95 cm	Pale brown to light yellowish brown	Semi compact	Red ware, black-and-red ware and red slipped ware. brick bats, hopscotches, unidentified iron objects, unidentified copper and carnelian bead.
3.	B21	2	96-182 cm	Light orange brown	Semi compact and compact	Red ware, black-and-red ware, red slipped ware, black ware, hopscotches, carnelian bead, amethyst bead and an unidentified tiny piece of gold.

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
4.	B21	3	183 – 228 cm	Light brown	Semi compact	Red ware, black-and-red ware, red slipped ware and black ware.
5.	B21	NS	229cm	-	-	-

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	C21	Humus	0-12 cm	Pale brown	Sandy silt	Red ware, black-and-red ware, red slipped ware, hopscotch and agate bead.
2.	C21	1	13-88 cm	Pale brown to light yellowish brown	Semi compact	Red ware, black-and-red ware and red slipped ware, brick bats, hopscotches, unidentified iron objects, gamesman, agate bead and copper nail.
3.	C21	2	89-252 cm	Light orange brown	Semi compact and compact	Red ware, black-and-red ware, red slipped ware, black ware, hopscotches, bone bead, spindle whorl, gamesman, bone point and unidentified gold.
		3	253 - 291 cm	Light brown	Semi compact	Red ware, Black and red ware, Red slipped ware, Black ware. Spear head
4.	C21	3	253 – 291 cm	Light brown	Semi compact	Red ware, black-and-red ware, red slipped ware, black ware and spear head
5.	C21	Pit	138 – 168 cm		Loose	Red ware, black-and-red ware, red slipped ware and black ware.
6.	C21	NS	292cm	-	-	-

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
1.	C20	Humus	0-13cm	Pale brown	Sandy silt	Red ware, black-and-red ware and red slipped ware, hopscotch.

S.No	Trench	Layer	Depth	Colour	Texture	Cultural Material
2.	C20	1	14-92 cm	Pale brown to light yellowish brown	Semi compact	Red ware, black-and-red ware and red slipped ware. brick bats, hopscotches, unidentified iron objects, gamesman, agate bead, copper nail, ear lobe and amethyst bead.
3.	C20	2	93-223 cm	Light orange brown	Semi compact and compact	Red ware, black-and-red ware, red slipped ware, black ware, hopscotch-es, bone bead, spindle whorl, gamesman, sling ball, copper coin.
4.	C20	3	224 – 294cm	Light brown	Semi compact	Red ware, black-and-red ware, red slipped ware and black ware.
5.	C20	Pit 1	145 – 183cm		Loose	Red ware, black-and-red ware, red slipped ware and black ware.
6.	C20	Pit 2	138-209 cm	-	Loose	Red ware, black-and-red ware, red slipped ware and black ware.
7.	C20	Pit 3	195-257 cm	-	Loose	Red ware, black-and-red ware, red slipped ware and black ware.
8.	C20	NS	295cm	-	-	-

Acknowledgement

The Excavation at Porpanaikottai in Pudukkottai district was carried out under the Guidance of Thiru. T. Udhayachandran, IAS., Principal Secretary and Commissioner, Dr. R. Sivanandham, Joint Director, Tamil Nadu State Department of Archaeology. I would also like to thank K. Rajan, Academic and Research Advisor, TNSDA and V.P. Yathees Kumar, Deputy Director, Tamil Nadu State Department of Archaeology. With their great support, I directed the excavation.

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Excavations at Vembakottai

P. Baskar
R. Barathkumar

Introduction

Vembakottai (Lat. 9°20'3.39" N; Long. 77°46'2.56" E) is a village located on the northern bank of the Vaippar River in Vembakottai taluk in the Virudhunagar district of Tamil Nadu (Figs. 8.1-8.2). It lies on the Sivakasi-Kalugumalai road about 15km from Sivakasi and 23km south of Kalugumalai. The site can be easily accessible by travelling about 48km south-west of Virudhu nagar through the Virudhunagar-Sivakasi-Kalugumalai highway and also the village Vembakottai can be approached for about 20km west of Sattur. The archaeological site lies opposite the Munneshwaran temple, 1km east of Vembakottai village. The mound lies to the west of the present village and to the south-west of Vijayakarisalkulam village. A modern temple, a graveyard and a few modern structures occupy some portion of the mound.

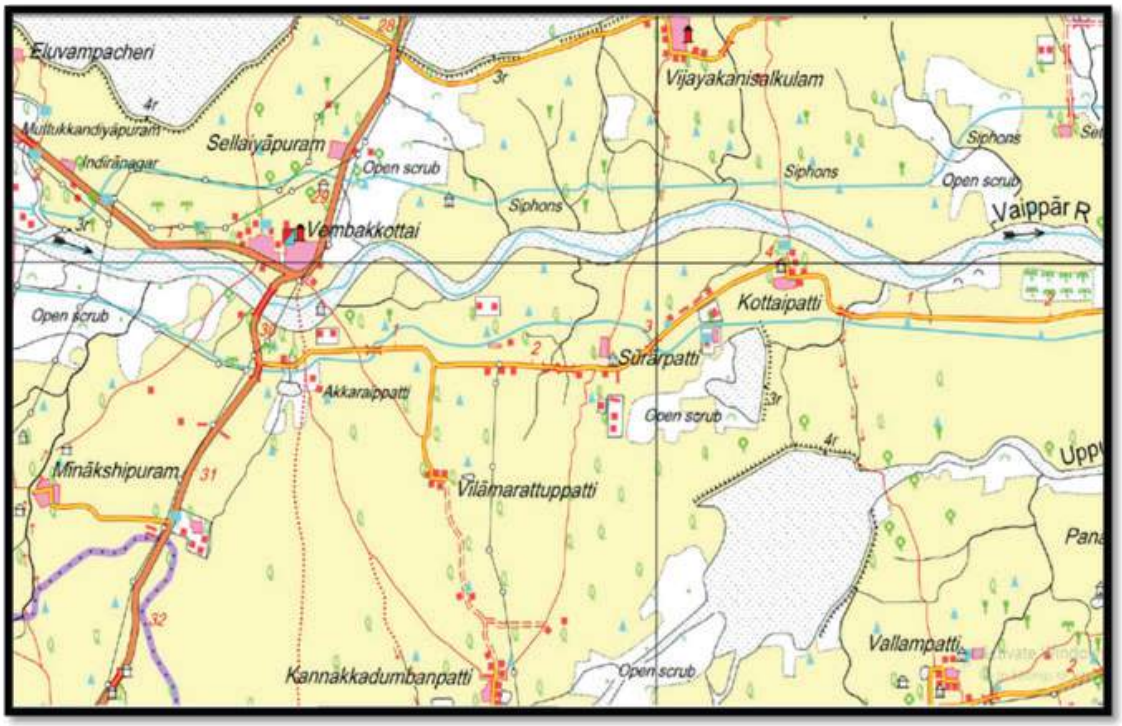

Fig. 8.1 Vembakottai: Village Map

Pandya inscription mentioned Vembakottai as a *Venbaikudinadu,* the term *Veṇbai* could be interpreted as a vast plain land occupied by some ancient inhabitants. The present name was derived from the Nayak period copper plates, which mentioned *Venbakudi* as a Vembakottai. Another interesting note is that the site is located 15km away from Tiruthangal. Tamil Nadu State Department of Archaeology excavated Tiruthangal in 2005-2006 and found microlithic tools.

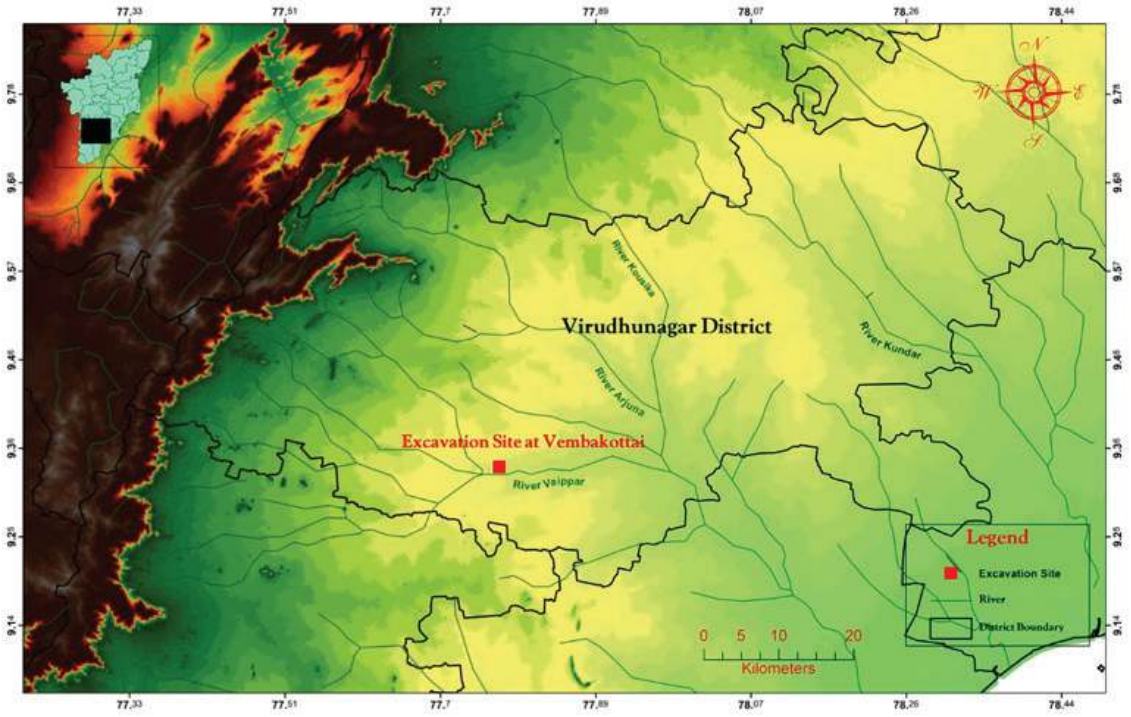

Fig. 8.2 Vembakottai: Site Location Map

Geology

The site lies on the left bank of the river Vaippar, one of the major river basins in Tamil Nadu, having a drainage area of 5423 sq. km. It originates from the Varusanadu hills bordering the state of Kerala, runs from the Rasingaperi canal in Sivagiri and flows through the Virudhunagar and Thoothukudi districts. It is bounded by the Vaigai basin and the Western Ghats on the western side, the Tamarabarani and the Kallar basin on the southern side and the Gundar river basin on the northern side. This basin has been divided into 13 sub-basins: Nichabhanadhi, Kalinkalar, Deviar, Nagariyar, Sevalperiyar, Kayalkudiyar, Vallampatti Odai, Sindaplli Uppodai, Arjunanadhi, Gowshiganadhi, Uppathurar, Senkottaiyar and Vaippar Main.The geological formation of the district is covered by a vast tract of black soil with residual hills and knolls and minor minerals such as lime kanker, blue metal, dimension stone, brick sand and gravel are active in the

district. The region exposes Khondalite groups of rocks and migmattite gneisses, which belong to the Precambrian age. The Khondalite group of rocks comprises charnockite, crystalline limestone/calcgnesis, granite and quartz veins from the younger intrusive. A similar type of charnockite, crystalline limestone and granite occurred around the site.

Flora and Fauna

Based on the geographical factors, the flora of the Virudhunagar region can be divided into two broad categories, namely the varieties found in the hilly Western Ghats and the eastern plains. As per available reports, the forest cover in the entire region, mainly on the Western Ghats, is estimated to cover 259 square kilometers. The Western Ghats rise to an elevation of more than 3000 feet and have been bracketed under the western tropical evergreen forest cover. In Virudhunagar district, the major horticulture crops grown, covering 13590 ha. of area, are mango, guava, banana, amla, tomato, brinjal, lady's finger, onion, coriander, chilies, flowers like jasmine, *arali,* tuberose, etc. Trees like neem, banyan, coconut, palmyra, tamarind, moringa, papaya, guava, *karuvelam* and banana trees are noticed in this village and in the agricultural land, people grow paddy grains and vegetable plants.

The fauna of the Virudhunagar region does not offer a diverse range of animals, but it contains the typical species common to other parts. The wild species are primarily confined to the Western Ghats. Species like wild pig, porcupine, spotted deer, barking deer and wild hare are confined to plain forests. Animals like goat, cows, buffalo, wild pigs, deer, peacocks, dogs and cats are noticed in this village. Many types of snakes, the oriental garden lizard, the mongoose and rodents are also found. Apart from these, 31 bird species were recorded in the Vembakottai reservoir area, such as darter or snake bird, black winged stilt, blue-tailed bee-eater, blue-eared kingfisher, painted stork, open-billed stork and white stork.

Historical settings

The historicity of the site can be studied with the help of a few inscriptional sources and through field exploration to locate the archaeological sites in and around the village of Vembakottai. The village is surrounded by historical and culturally significant items such as microlithic sites, burials anda medieval period Siva Temple. Literature of the post-Sangam age and epigraphical records of the early and later Pandyas refer to 14 *nadu* divisions corresponding to Virudhunagar district, in which *Vembaikudinadu* is identified as the present southern part of Sivakasi and Vembakottai.

A 9th-century *Vatteluthu* inscription of *Parantaka Viranarayana* issued in his 6th regnal year found on a rock at Nadikkudi registers a gift of 15 gold coins by *Kadathirukkai Kavithi* alias *Manonmayan Maran* of *Venbaikkudinadu* for lighting a lamp in the Siva temple. A stone slab found east of the Edirkottai village records the offering lands belonging to *Vikramapandiswaram Udayanayanar koil* at *Venbaikkudi* in *Venbaikkudinadu.* This inscription is dated to the reign of *Jatavarman Sundra Pandya* (1260 CE). The Siva temple in the village is called Chokkanathaswamy koil. It was built by the later Pandya rule and the temple was called *Vikrama Pandya Isvaramudayar koil* in the past.

Kazhugumalai inscription mentions Jaina teacher *Venbaikkudi Tachchan Sangakkuraththigal* and *Vijayakurattiyar.* An Anamalai inscription under a Jain image in half relief on the rock near the cavern mentions a person who belonged to Sri *Venbaikkudinattu Venbaikkudi Vettancheri.* Ambasamudram Tirumulanatha temple inscription registers a gift of money made by *Kavadiyar* of *Ilavenbaikkadattirukkai* of *Venbaikkudi-nadu* for two lamps to be burnt in the temple before the images of God *Tiruchchalaitturai-Tirumulatanattur-Bhatarar* and *Perumanadigal,* who was pleased to stand at *Tiruchchalaiturai* in Ilangoykkudi in *Mulli-nadu*. A Siva temple was found in Vembakottai and it belongs to the Pandya period based on the architectural features. The temple does not have any epigraphical evidence of the Pandya period. A head of a broken Ayyanar sculpture of the medieval period was found north of the mound.

Previous Study

During the pre-Independence Era, Robert Bruce Foote reported Palaeolithic tools from Aviyur in the Aruppukottaitaluk. Before Independence, the Deputy Collector of Tirunelveli L. Cammiade explored the Vaippar basin. Microlithic tools have been recovered from sites in the Arjunanadhi and Vaippar basins.

In 1992 R. Balachandran explored the Arjunanadhi basin and the Vembakottai area and found microlithic tools. From 1992 to 1993, Sampath and Srikumar discovered a fossilized lower left molar identified as *Elephas maximus* of a living Indian elephant at Vembakottai. In 1996, V. Selvakumar explored the Upper Gundar basin and he recovered microlithic tools from various sites. In 1998, Tamil Nadu State Department of Archaeology explored a stretch of 25km along the Arjuna riverbed and terraces. In 2010-11, M. Rajesh investigated the Vaippar river basin and explored the Vembakottai site and he noticed a terracotta ring well, terracotta pipes and shell bangles. During the exploration, the mound represents a multi-layered cultural sequence of material, making it appraisable to conduct large-scale horizontal excavation at Vembakottai.

Previous Excavation

The State Department of Archaeology excavated at Tiruthangal in 1995-1996. Numerous microliths were unearthed from an area west of Tiruthangal during the excavation. The artefacts collected from this include shell bangles, terracotta toys, terracotta dice and semi-precious beads. From 2001 to 2002, the State Department of Archaeology excavated at Mangudi of Sankarankoil taluk. Excavation yielded microlithic tools, beads, dice, iron daggers, copper coins, Roman pottery and Tamil-Brahmi shreds.

Excavations and Cuttings

Archaeological Mound

The huge habitation mound is located on the left bank of the Vaippar river. The site Vembakottai met with the cultural deposit extending over a vast area of more than 50 acres and the mound rises about 6m in height from the present ground level (Fig. 8.3). The archaeological mound is locally called *Mettukadu* or *Uchimedu.* Another archaeological mound covering 2 acres was noticed on the northeastern side of the village, which is locally called *Nathamedu.*

Fig. 8.3 Vembakottai: General view of the site

Fig. 8.4 Vembakottai: Arial view of excavated trenches

Fig. 8.5 Vembakottai: Arial view of excavated trenches

Vembakottai Excavation- Key trenches

Cuttings

The entire mound was laid out using a horizontal method (Figs. 8.4-8.5). The habitation mound labelled as Locality -01 and the whole area was laid out into a grid work, each measuring 5m x 5m with a digging area of 4 x 4m,

leaving a baulk of 50cm on all four sides. The systematic excavation initiated at Vembakottai in 2022 and 58 trenches were laid in three seasons of excavation. The mound was subdivided into four zones, keeping the cardinal directions in view. The centre of the mound has roughly been fixed, keeping in view the surface features of the mound and the trenches were laid out on the top of the mound. It yielded a maximum cultural deposit of around 2.60m.

Excavation Details					
Trench	**Context**	**Layer Thickness (cm)**	**Layer Contents**	**Pottery Types**	**Key Antiquities**
A2	Humus	5 - 12	Light grey, loose, gravel	Mixed	Spindle whorl
	Layer 1	68 - 143	Light grey, loose/ compact, sand	Coarse RW, RW, RSW	Glass beads, shell bangles
	Layer 2	49 - 110	Dark brown, semi-compact, ash, lime	Coarse RW, RSW,BSW	Terracotta dice, amethyst bead
	Pit 1	61	Ashy, silty clay	-	-
	Posthole 1-3	15, 33 (dia), 13 (dia)	Loose sand	-	-
D1	Humus	9 - 20	Light grey, loose, sand, gravel	Mixed	Shell bangles
	Layer 1	93 - 120	Light brown, semi-compact, brick bats	Coarse RW, RW, RSW	Terracotta seal, amethyst bead
	Layer 2	78 - 191	Light brown, semi-compact, silt, clay	Coarse RW, RW, RSW, BW	Copper ring, iron objects
	Dump	18 - 76	Tiny potshards, brick bats, pebbles	-	-
N4	Humus	11 - 21	Light grey, loose, sand, gravel	Mixed	Glass bead
	Layer 1	27 - 125	Light grey, loose, sand, silt	Coarse RW, RW, RSW	Terracotta figurine, chert flakes
	Layer 2	40 - 140	Dark brown, semi-compact, silty clay	Coarse RW, RSW, BSW	Female torso figurine, chert flakes
V3	Humus	6 - 18	Light grey, loose, gravel	Mixed	Two copper coins

Trench	Context	Layer Thickness (cm)	Layer Contents	Pottery Types	Key Antiquities
V3	Layer 1	66 - 112	Light grey, loose, sand, brickbats	Coarse RW, RW, RSW	Broken gold plate, glass beads
	Layer 2	50 - 122	Dull yellow-orange, loose, ash, lime	Coarse RW, RW, RSW, BSW	Amethyst bead, iron object
	Layer 3	32 - 116	Brown, semi-compact, silt, ash, clay	Coarse RW, RW, RSW, BSW	Iron objects, copper objects
ZL3	Humus	4 - 16	Light grey, loose, gravel, dung	Mixed	Shell bangles
	Layer 1	24 - 50	Light grey, loose, sand, brickbats	Coarse RW, RW, RSW	Glass beads, spindle whorl
	Layer 2	64 - 95	Dull yellow-orange, loose, ash, lime	Coarse RW,RW, RSW, BSW	Soapstone bead, copper object
	Struc-ture	-	Circular stone rubbles	-	-
ZJ3	Humus	4 - 14	Light grey, loose, gravel	Mixed	Glass beads
	Layer 1	58 - 96	Light grey, loose, sand, brickbats	Coarse RW, RW, RSW	Glass beads, spindle whorl
	Layer 2	50 - 110	Dull yellow-orange, loose, ash, lime	Coarse RW, RW, RSW,BSW	Gold pen-dant, ame-thyst bead
	Layer 3	52 - 138	Brown, semi-compact, ash, silty clay	Coarse RW, RW, RSW,BSW	In-situ glass beads, iron objects

Trench	Context	Layer Thickness (cm)	Layer Contents	Pottery Types	Key Antiquities
EEE8	Humus	8 - 20	Dull orange, compact, sandy gravel	Coarse RW, RW, RSW	Glass beads, shell bangles
	Layer 1	28 - 54	Light grey, loose, silty sand	RW, RSW	Terracotta objects, shell rings
	Structure	-	Burnt brick, mud/ lime mortar	-	-
	Layer 2	24 - 78	Dull yellow-orange, loose, silty clay	RW, RSW,BSW, Brown SW	Weighing stone, quartz beads
	Layer 3	46 - 90	Dull yellow-orange, semi-compact, clay	RW, BRW, BSW	Amethyst, soapstone beads
TT6	Humus	8 - 18	Light yellowish grey, compact	Coarse RW, RSW	Terracotta figurines, game pieces
	Layer 1	30 - 52	Light grey, loose, silty sand	RW, RSW, Brown SW	Soapstone bead, shell beads
	Layer 2	50 - 90	Yellowish brown, compact	RW, RSW, BSW, Brown SW	Iron rod, broken figurine
	Layer 3	42 - 80	Dull yellow-orange, loose, clay, silt	RW, BRW, BSW	Iron nails, rods, terracotta wheel

Fig. 8.6 Vembakottai: A2 Trench – Southern Section

Fig. 8.7 Vembakottai: D1 Trench – Northern Section

Fig. 8.8 Vembakottai: N4 Trench – Western Section

Fig. 8.9 Vembakottai: V3 Trench – Western Section

Fig. 8.10a: Vembakottai- Storage Jar

Fig. 8.10b: Vembakottai- Storage Jar – Top

Fig. 8.11 Vembakottai: Stone Structure – Top view

Fig. 8.12 Vembakottai: Glass beads – In situ

Fig. 8.13 Vembakottai: ZJ3 Trench - Southern Section

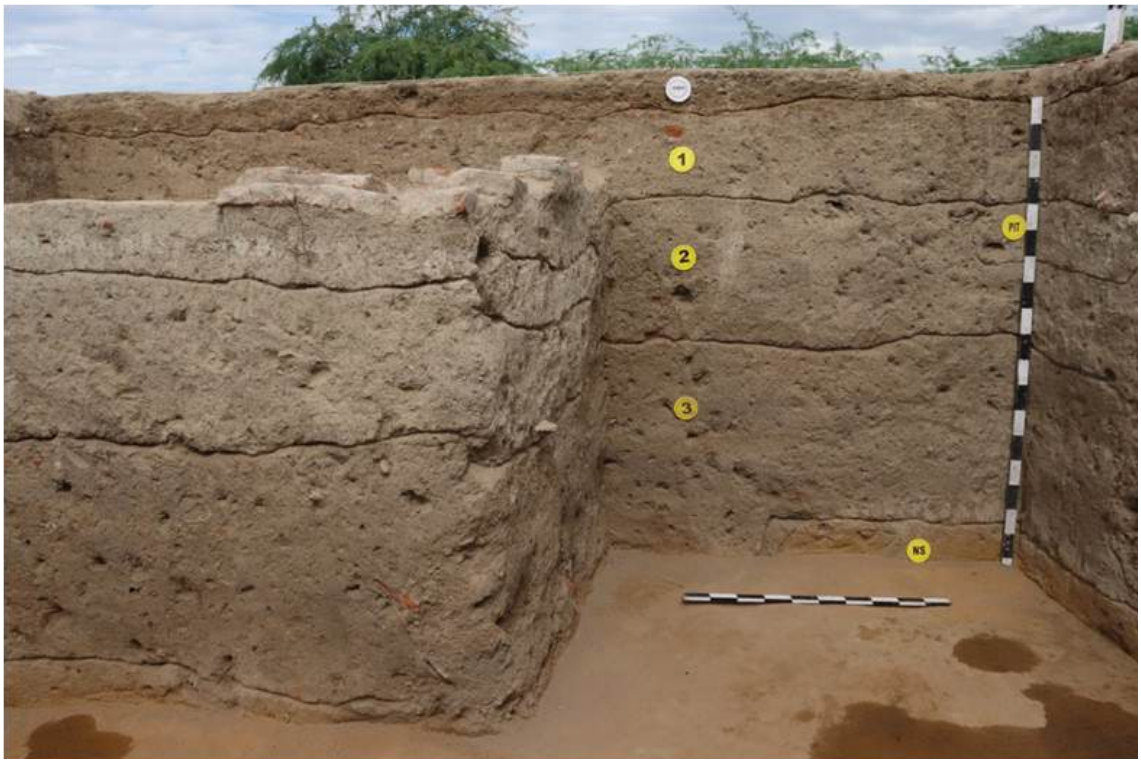

Fig. 8.14 Vembakottai: EEE8 Trench - Western Section

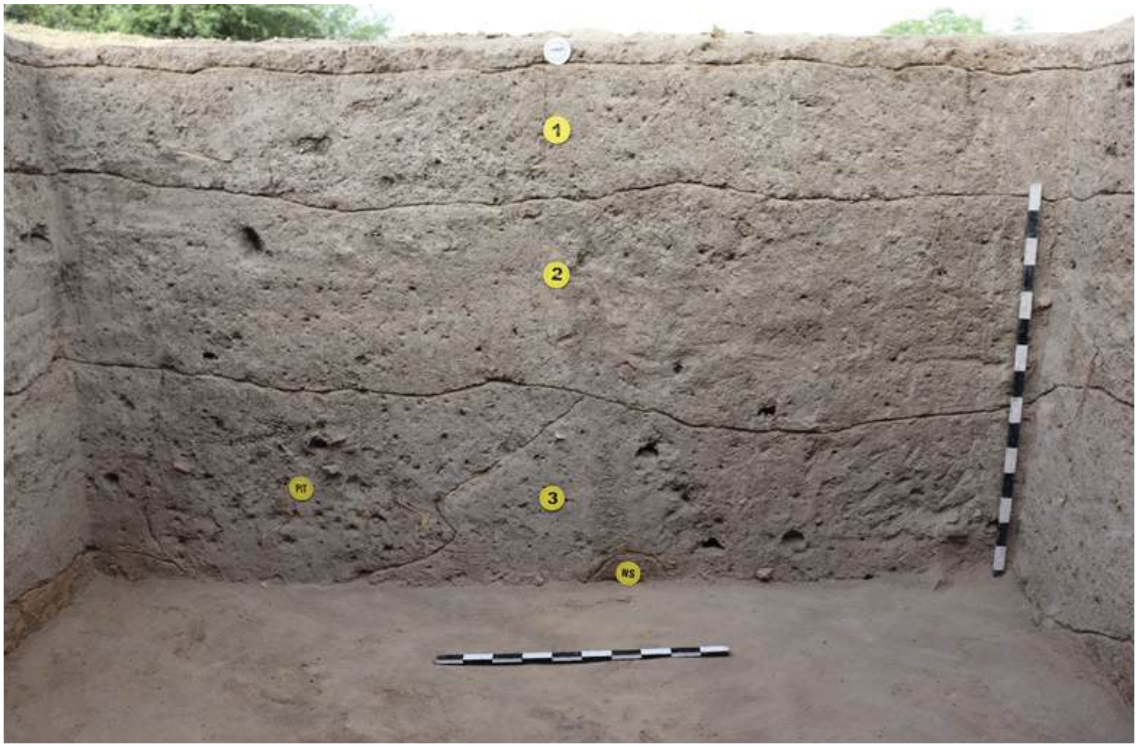

Fig. 8.15 Vembakottai: TT6 Trench - Western Section

Pottery

The black-and-red ware of the Iron Age/Early Historical Period unearthed from the habitation site is generally acceptable. The pots are wheel-turned and the clay used is well levigated. The black-and-red ware of the Early Medieval Period is a comparatively coarse variety and also dull in colour. Red ware has standard shapes, including variants and comprises several kinds of bowls, dishes, vases, conical vessels, small jars, carinated pots and others. The black ware is comparatively ill-fired. The ware is usually thicker than the black-and-red ware but thinner than the red ware. Some of the standard shapes of this ware are: funnel-shaped lid, knobbed and animal-topped lid, lipped bowl of the different varieties, small pot, carinated pot, etc. The red ware of both highly polished with bright red slip type and terracotta colored with a dull slip or wash type is found. The latter category has both thick and medium types. The Early Historical Period's red ware is primarily plain but occasionally decorated with incised lines and other patterns. The red ware pottery continued for the entire period, not withstanding accretions to the shapes and types in each stage. A mixed variety of pottery was noticed in the habitation area. The potshards were poorly preserved, so identifying the shapes was challenging. Generally, it yielded degenerated potshards mixed with the soil. Red ware is the predominant type in the ceramic industry of Vembakottai, particularly in layers 1 and 2. Further, its number decreases rapidly and almost

completely disappears in layer 3. This ware was probably used for day-to-day work for all purposes. Both ill-fired and well-fired forms were evident, made on a slow to medium wheel. The ware was invariably thin to medium fabric with blackish grey cores and decorated with incised designs on the rims and shoulders. Most of the shapes of this ware include a vase, a bowl, a basin, a storage jar, a dish, a lid and miniature pots.

The ceramic types of Vembakottai excavation represent varieties of the Iron Age. Early historical and medieval potteries include black-and-red ware, red ware, red slipped ware, black slipped ware, brown slipped ware and coarse red ware. Typologically, in this site, potteries are represented from the early Iron Age period and continued till the beginning of the Early Historical Period. The black-and-red ware, red ware and other potteries represent the Iron Age period.

Black-and-red ware

This ceramic type is the earliest known pottery of peninsular India, occurring primarily in an Iron Age context. This pottery was made using the inverted firing technique. As a result, the whole of the interior and the rim portion on the exterior turns black, while the remaining exterior portion of the vessels became red. The fine varieties of this ceramic are thin in proportion and they are wheel-made and sometimes handmade.

Black Ware

It is a highly polished type of pottery associated with black-and-red ware from South India. Its interior and exterior surfaces are black, as it is wheel-made and fired at a medium to high temperature, resulting in the metallic sound of this ware when struck. The fine variety of the ceramicsis made from well-levigated clay with a glossy appearance.

Red Slipped Ware

The occurrence of the red slipped ware is noticed as early as the Iron Age and lasts till the Medieval Period. A red slip was applied over the red ware, giving a shining look. It was evenly distributed on the exterior surface and the inner portion of the rim when the vessel was in leather-hard condition.

Red Ware

The red wares are entirely monochrome and the fabric changes from coarse to fine when turned on the wheel. The red wares are fired in general at a medium temperature. It is manufactured using the open kiln method. A red colour is observed due to the open firing on the surface.

Brown Slipped Ware

This ware appears at all levels due to its usage by common folk. It is a dull red ware of impure clay mixed with sand and grass. The surface is rough but uniformly fired and the interior differs from other wares' material and artistry. Common shapes of this ware are pots, deep and shallow bowls, tubs and other storage vessels.

Perforated Ware

In this type of pottery, perforations were found on the body portion of the pots. Usage of the perforated ware was traced from the Neolithic period to the Modern period in South India. These potteries were used to filter the boiled grains. These kinds of perforations were made on the various types of potteries like grey ware, red ware and red slipped ware.

Artifact Distribution

The following matrix illustrates the distribution of key diagnostic artifacts across the stratified contexts of the eight trenches, highlighting patterns of co-occurrence and concentration that inform the interpretation of activity areas. (P = Present; C = Concentration)

Artefact Type	A2-L1	A2-L2	D1-L1	D1-L2	N4-L1	N4-L2	V3-L1	ZJ3-L2	ZJ3-L3	EEE8-L1	EEE8-L2	TT6-L3
Terracotta Seal			P									
Gold Objects							P	P				
Copper Coins							P Humus					
Weighing Stone											P	
Iron Nails/ Rods												P
Chert Flakes					P	P						
Terracotta Dice		P										
Terracotta Figurines					P	P						P
Glass Beads (in-situ)									P			
Amethyst Beads		P	P				P	P			P	
Spindle Whorl	P		P		P		P					

Antiquity Description

The antiquities unearthed from the excavation at the Vembakottai site span from the Early Historic Period to the Late Medieval Period. The site yielded more variety and was rich in number; it revealed the wealth and lifestyle of the people. The excavation yielded 12926 antiquities from the various levels. Considering raw materials, these antiquities can be categorized as stone, semi-precious stone, glass, ivory, gold, shell, terracotta, Iron, copper and bone objects. Some were used as toy objects or ornaments, household objects, ritualistic objectsor implements of hunting and agriculture. Among them, a bulk of artifacts belonged to the category of glass beads, glass bangles, followed by terracotta objects such as gamesmen, earlobe, wheels, figurines, spindle whorls, smoking pipes, rings, animal figurines and seals, shell bangles, shell beads, shell rings, shell pendants and semi-precious stone beads such as carnelian, agate, amethyst, quartz, crystal, soapstone and metal objects such as gold, iron and copper objects. Apart from stone objects like rubbing stones, weighing stones, beads and balls, other objects were collected from the site.

Glass objects

Glass objects are the major component of the artifact collection in Vembakottai. These glass objects are approximately 60 percent of the artifacts unearthed in this season's excavation. The Glass object includes beads and bangles (Figs. 8.16-8.17). Nearly 7000 beads and 40 bangles were found in this site. Generally, the glass beads are micro in size and various shapes, such as circular, barrel, tubular, bi-conical and spherical and a few are unidentified. The colours include shades of green, maroon, orange, blue, yellow, black and white. The green colour micro glass beads are dominating in quantity, followed by red colour. The ZJ3 trench yielded 26 beads and an associated two red slipped ware pots at a depth of 1.85cm, which indicates this place could have served as a bead industry during the Early Historical or Medieval Period.

Glass bangles

Forty fragments of bangles were unearthed from the site. One bangle was decorated with incised lines, which are semi-circular in shape with a round and rectangular section. The colours include shades of yellow, black, blue and green.

Fig. 8.16 Vembakottai: Glass Beads

Fig. 8.17 Vembakottai: Glass Bangles

Stone Objects

The excavation produced nearly 60 stone objects: sling balls, beads, axes, grinding and rubbing and a few unknown objects (Figs. 8.18-8.19). These were generally used for gaming purposes, household, measurement ornaments and a few as weapons.

Stone ball (or) Sling ball

The excavation has recovered nearly 15 stone balls, which were unearthed in various levels in the trenches. Stone balls are generally spherical and the surface is polished, with a few having a rough surface. These balls might have been used for hunting and measuring because a few balls have a rough, flat base.

Rubbing Stones

The excavation has recovered nearly 10 rubbing stones, which were unearthed in various levels in the trenches. These stones are typically flat-based and have a smooth surface. The shapes are rectangular, square and roughly elongated oval. This could be used as a grinding or floor polishing stone.

Fig. 8.18 Vembakottai: Stone Balls

Fig. 8.19 Vembakottai: Rubbing Stones

Gold

The excavation yielded eight gold objects, including beads, an ear stud, a pendant, small pieces of plate and a coin (Figs. 8.20-8.21). Two spherical beads

were noticed from the excavation. The ear ornament was collected at a depth of 82cm. Measures like 1.1cm in length, 0.6cm in diameter at the trench of Q3. It is used as an ornament on the top portion.The pendant was recovered from a depth of 1.10m. It has a hole at the top and is decorated with a dotted design. A circular-shaped gold coin was noticed from the DDD14 trench at a depth of 27cm.

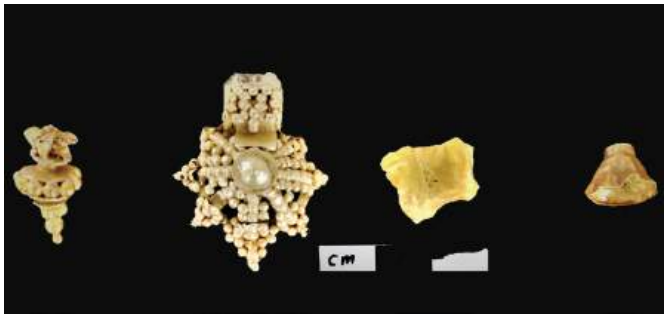

Fig. 8.20 Vembakottai: Gold Objects

Fig. 8.21 Vembakottai: Gold Coin

Copper coin

Nearly 20 coins were collected from the site (Figs. 8.22-8.23). The coins were mostly made out of copper and were rough, circular and elliptical. The coin was mostly minted in medieval times, between the fifteenth century CE and the eighteenth century CE, especially the Nayak period, which was found from the surface to layer 2. These coins belong to Madurai Nayak, Thanjavur Nayak, Venad Cheras and the local Nayak period. One circular coin was noticed at a depth of 2.48cm. The copper coin obverse features a Siva and Parvathi figurine, on the reverse side *''Sri Veera''* in Telugu letters is depicted. These coins were found in the Madurai Nayak period.

Fig. 8.22 Vembakottai: Copper Coin

Fig. 8.23 Vembakottai: Copper Coin

Ivory objects

Ivory objects are the most precious materials from the site (Figs. 8.24-8.25). Nearly six objects were recovered from the site at various levels. Those are three pendants, one rectangular-shaped dice, one cylindrical-shaped bead and one object resembling an ear stud or gamesmen.

Ivory Pendants

Three objects resemble pendants with perfectly shaped and polished surfaces due to master craftsmanship. These ivory objects were drilled and cut, perfectly decorated with grooved lines on the surface. It is handmade with carved designs and shapes such as elongated and conical, with a flat surface and a hole on the top portion.

Fig. 8.24 Vembakottai: Ivory Pendants

Fig. 8.25 Vembakottai: Ivory Bead

Semi-precious stone beads

The excavation at Vembakottai produced an enormous beads made of glass, shell, terracotta, ivory, stone and semi-precious stone. In Tamil Nadu, the occurrence of semi-precious stone beads starts from the Iron Age period. Nearly 40 semi-precious stone beads were recovered from the site of different raw materials such as carnelian, amethyst, agate, quartz and crystal beads (Figs. 8.26-8.29). The shapes are spherical, barrel, cylindrical, bi-conical, tubular, multifaceted, etc.

Soap stone

Nearly 35 soapstone beads were collected in different levels (Fig. 8.30). It is a metamorphic rock, green in colour, known for being soft and easy to carve compared to other stones. The shapes are spherical, barrel, cylindrical, bi-conical, tubular, multifaceted, etc.

Fig. 8.26 Vembakottai: Carnelian Beads

Fig. 8.27 Vembakottai: Carnelian Beads

Fig. 8.28 Vembakottai: Quartz and Agate Beads

Fig. 8.29 Vembakottai: Amethyst Beads

Fig. 8.30 Vembakottai: Soap stone Beads

Terracotta Objects

Terracotta objects are essential sources that help to understand the ancient past of humans. Terracotta making has flourished since prehistoric times. The terracotta industry flourished during this period and was reported from all the explored and excavated sites. The excavation unearthed as many as 500 terracotta

objects of human and animal figurines, beads, wheels, sling balls, gamesmen, bulls, weighing units, earlobes, seals, pendants, smoking pipes, dice, rings, toy vessels and spindle whorls.

Figurines

In these two phases of excavation, nearly 60 terracotta figurines were unearthed at the various levels (Fig. 8.31-8.32). It includes female and male figurines, torso, head of human figurines, animal and bird figurines. Most of the figures were handmade and a few were made with a mould platform. Some figures are highly decorated and carved, showing the site's craftsmanship. Two torsos of female figurines were collected. Both are decorated with neck and low hip portions, with legs and hands in good condition and are red in colour. Another one with a left hand broken and black in colour, without any decorations.

Fig. 8.31 Vembakottai: Terracotta Figurine

Fig. 8.32 Vembakottai: Terracotta Figurine

Beads

The site has reported nearly 80 beads, which are spherical, barrel, arecanut, pear, drop and conical in shape (Fig. 8.33). All the beads are in good condition and in red and grey colours. These beads are well-fired, have medium to coarse fabric and are handmade and wheel-made. These beads are generally used for ornamentation purposes. Few beads have groove lines on the top and bottom portions.

Wheels

Terracotta wheels are essential objects for children's amusement. More than 19 pieces of disc-like objects have been collected, with a hole at the centre, probably to be fixed with a central rod as connections to the wheels to tie (Fig.

8.34). Most of these fragments have a single hole in the centre and a few of them have two holes in the centre portion. These wheels are well-fired and medium fabric to coarse fabric and they are both handmade and wheel-made.

Fig. 8.33 Vembakottai: Terracotta Beads

Balls

The excavation yielded nearly 15 terracotta balls from various levels. All are spherical in shape and have a rough surface (Fig. 8.35). It is made of handmade, medium and ill-fired and medium to coarse fabric. It can be used for playing or hunting purposes and measuring objects.

Fig. 8.34 Vembakottai: Terracotta Wheels

Fig. 8.35 Vembakottai: Terracotta Balls

Gamesman

In this excavation, more than 65 pieces made out of terracotta, well-fired and ill-fired, were recovered in various levels (Fig. 8.36). Shapes such as conical, tube, barrel, cylindrical, etc. It has fine to medium fabric in red and black colours. These are generally flat-based with convex sides and a few have a polished surface. These objects might be used to play the ancient games such as chess and the goat and tiger game.

Bulls

The fragments of terracotta bull figurines are without a head portion. Nearly 25 bull figurines are collected at the different levels (Fig. 8.37). The colour of the object was red and grey with ill and well-fired conditions. All the bull figurines were noticed to have a humped point and their heads are missing. Bulls are made of handmade and smooth surfaces.

Fig. 8.36 Vembakottai: Terracotta Gamesmen

Fig. 8.37 Vembakottai: Terracotta Bull

Earlobes

More than 100 terracotta ear ornaments were recovered from the site. Few with emprise design on one side as decoration. Some are worn as ornaments to elongate the earlobes (Figs. 8.38-8.39). Most of the object is decorated on one side only, which is displayed. Some decorations include a rough floral pattern, dotted design and thick incised line design and circular geometric designs are observed. The other side is flat and plain without any decorations. The shapes are circular, reel, *damaru,* U-shape, etc.

Fig. 8.38 Vembakottai: Terracotta Earlobe

Fig. 8.39 Vembakottai: Terracotta Earlobe

Seals

A total of 25 seals were found at the site. It had a rounded knob with a flat base (Fig. 8.40). These seals are made of handmade and well-fired clay. It has a smooth surface and a few are polished. It was probably used for trade purposes.

Pendants

The excavation recovered nearly 60 terracotta pendants (Fig. 8.41). Pendants are made of terracotta, handmade, ill-fired and well-fired. Shapes such as bell, cylindrical, conical and most pendants have a hole on the top and a circular bottom. These are handmade and have a fine to medium surface. Some had a slight projection at the base and groove lines on the top portion.

Fig. 8.40 Vembakottai: Terracotta Seal

Fig.8.41 Vembakottai: Terracotta Pendant

Smoking pipe

Smoking pipes are made of terracotta in red and grey colours (Fig. 8.42). All the pipes are bell-shaped, with the top portion looking like a mini bowl with a centre hole and it continues to the bottom part open to exit. Some of the pipes are decorated with leaves, dots, curved lines and impressed designs are depicted on the top of the portions.

Fig. 8.42 Vembakottai: Smoking pipe

Dice

The site yielded two dice, one in terracotta and the other in ivory (Fig. 8.43). Both are rectangular in shape. Terracotta dice were collected at a depth of 210cm and they were well-fired, grey in color, with measurements like length 32.2mm, width 11.9mm and thickness 11.9 mm. The Ivory dice was recovered from a depth of 115cm. It was slightly broken on the edges and had a fine, grey surface. The terracotta dice are observed to have dotted markings encircled by circular incisions and both dice have four faces.

Fig. 8.43 Vembakottai: Dices

Rings

Terracotta rings five were noticed at the different levels in the season. The rings were plain and without any decorations (Fig. 8.44). Colors like red and grey are found in well-fired and ill-fired conditions. All the rings are made in a single hole at the center; they might be used for ornamentation or game purposes.

Fig. 8.44 Vembakottai: Terracotta Ring

Toy vessels

Terracotta toy vessels, nearly 54, were collected at the different levels. Shapes like mini bowls, mini pots and mini plates are in ill and well-fired condition, with grey and red colors. Some of the bowls and pots were decorated in the outer portions.

Fig. 8.45 Vembakottai:Terracotta Lamp

Lamps

The site has reported 10 terracotta lamps, classified as plain and decorative. It has a circular base with a wick and the outer edges are decorated with incised designs and floral petal designs. Lamps are handmade and in fine to medium fabric with a smooth surface.

Spindle whorls

More than 80 terracotta spindle whorls were collected at different levels (Fig. 8.46). Most of

the spindle whorls are pear-shaped and recovered with the hole of the centre as a thin metal rod with a base and fish-hooked like tip top to span cotton fibre in the thread (in Tamil it's termed as *Thakkali*). Colours such as red and grey with black and made of wheel turned with fine to medium fabric. Some of them had grooved lines on the top and base portions. The occurrence of spindle whorls highlights the activity of the textile industry.

Fig. 8.46 Vembakottai: Spindle whorls

Iron objects

The site unearthed nearly 150 fragmented iron objects; a few were found in intact pieces. Iron objects were classified into nails, chisels, knives, rings and unidentified broken objects (Figs. 8.47-8.48). Most of the objects were found in the lower level, particularly layer 3, which could belong to the historical period and they are found in fragmentary and rusticated surfaces.

Copper objects

The site yielded nearly 42 broken fragments of copper objects. It includes antimony rods, rings, pieces of household objects and some unidentified objects. They are found in fragmentary and corroded condition.

Fig. 8.47 Vembakottai: Iron Chisel and Nails

Fig. 8.48 Vembakottai: Iron Rings

Shell objects

Shell is one of the most durable materials in the archaeological record, after stone and terracotta and most of the sites have a significant number of shell objects. The earliest evidence of shell objects belongs to the Neolithic period. In Tamil Nadu, Sangam literature has a greater number of references to shell and conch objects, which is evident from the early historic period. The shell industry is understood from the occurrence of a greater quantity of finished, semi-finished and unfinished objects. The Vembakottai excavation yielded more than 2000 shell objects, which include bangles, beads, rings and pendants (Figs. 8.49-8.50). Apart from objects, sawed conches and a few cores were collected from the site. The bangles were plain, decorated and a few painted ones were found at the site. Most

of the bangles were decorated with incised and criss-cross lines and a few were painted with red ochre. Apart from bangles, more than 150 beads were recovered in various sizes and shapes, such as spherical, barrel and circular. The occurrence of finished and unfinished shell objects provides information that this site could be a shell industry during the historic period.

Fig. 8.49 Vembakottai: Shell Beads

Fig. 8.50 Vembakottai: Shell Bangles

Fig. 8.51 Vembakottai: Painted Shell Bangles

Lithic Assemblage

The earliest evidence of lithic assemblage in the region dates back to the Paleolithic period, when tools were found at Aviyur in the Aruppukottai taluk. The lithic industry of hunter-gatherers of the Vaippar river basin is dominated by microlithic elements consisting of geometric and non-geometric tools and flakes. More than 30 microlithic sites were identified in the Vaippar River basin. Few microlithic blade tools were collected from the surface at Vembakottai (Fig. 8.52). This is substantial evidence for conducting a scientific excavation, but no tools were found in the excavation. A larger number of chert cores, flakes and a few fluted cores were found at the site. Apart from flakes, two stone axes were found, with a triangular shape, a polished surface and a sharp edge with a blunt butt end; they could be used for hunting or agricultural activities (Fig. 8.53).

Fig. 8.52 Vembakottai: Flakes and Fluted cores

Fig. 8.53 Vembakottai: Polished Axe

Bone objects

The bone point was one of the significant finds of the Vembakottai excavation. A single bone point has been unearthed, with a polished and pointed tip on both sides.

Cultural Sequence

The excavation on the habitation mound at Vembakottai contains a depth deposit of about 3m. It records a continuous settlement inhabited by our ancestors. The thickness of the layers is nearly 10cm to 1.25cm in height, showing the incessant occupation. The evidence of the earliest human presence in the Vembakottai has come from stray Iron Age people. Based on cultural materials such as ceramics, terracotta figurines, terracotta objects, shell objects, gold and iron, copper objects and other materials, the cultural deposit is divided into three phases, namely the Iron Age, Early Historical Period and Early Medieval Period from bottom to top, datable respectively 6th century BCE to 3rd century BCE, 3rd centuries BCE to 4th century CE and 4th century CE to 13th century CE.

Period I is represented by layer 3 and has a deposit of about 25 to 1.1cm thickness lying over the natural soil, containing an Iron Age assemblage distinguished by the introduction of iron technology. The deposit is compact, yellowish brown and yielded nearly 45% of slipped black wares. The black ware is made of ill-fired clay. Most black wares have thick rim portions, with few shards having only a thin section. However, the jar pieces, miniature pot, bowls and other pottery types are also found sparingly. Apart from the potteries, few artefacts such as semi-precious stone, glass beads, terracotta figurines, iron slags and fluted cores are encountered in this layer.

Period II is represented by Layer 2. Industrial-based and pastoral activities are the mainstay of their economy. Most trenches record firing activities with pit marks; however, they exhibit interesting evidence about the industrial activity associated with them. The entire trench has an ashy deposit. The lumps of fluid-texture slag are found in and around the pit, probably the mud slag. The glass bangles are mainly green in colour. Yellow and blue coloured bangle pieces are also found in smaller quantities. Apart from glass beads and bangles, beads of terracotta and semi-precious stones, terracotta figurines, terracotta earlobes, seals, pendants, hopscotches and other objects are also found in the early historical level. The spindle whorls were noticed at the same level, perhaps demonstrating the cotton weaving activity of the people. They were used for spinning cotton. The terracotta figurines belong to the lowermost depth of stratum 2 (i.e., Early Medieval Period) and exhibit their artistic excellence and maturity in their art. These figurines are comparable to the terracotta figurines found at other sites in Tamil Nadu, like Arikamedu, Kaveripattinam, Keeladi, etc. The figurines are made using both hand-modelling and moulding techniques. The torso of a female and two human figurines were collected, measuring 6cm, 1.6cm and 6.3cm in length, respectively. It is relatively dated to the 6th-7th centuries CE. This figurine was produced using the moulding technique. The mould technique was in vogue from the early centuries of the common era.

Layer 1 is assigned to the medieval period based on the cultural materials found in these layers. Coarse red ware, red ware and red slipped ware are found predominantly in this period. A considerable number of black slipped ware is also found. The major shapes of red ware are globular pottery, dishes, deep bowls, vases, lids of different varieties, etc. The bowl with a tapering body and featureless rim is a common vessel type in red ware. Mainly, red ware is also found. Few perforated potteries are uncovered in this level. The study and degenerated black slipped ware were found in smaller numbers. The fine black-and-red ware is almost absent, particularly at the top level. Although no settlement pattern or house plan was encountered during this period, the occurrence of many brickbats indicates some structural activity. Interestingly, a stone alignment is identified at the ZE1 and F1, a raised platform for some (unknown) activity. Stone rubbles were used and pottery pieces were collected on it.

Conclusion

The excavation at Vembakottai revealed some interesting and inevitable information about the site and its correlation study helps us improve the investigation on the Iron Age and Early Historical Period of Tamil Nadu.

Accordingly, the excavation exposed a semi-hard ash mixed lime patch in all trenches at a maximum of 1.10cm depth. It may suggest that the objects obtained from the patch level are associated with a small-scale industrial activity that might have been accomplished along with the habitation. The potteries unearthed from the site at various strata demonstrate the proper chronological sequences of pottery assemblage. The potteries occurred at the lowest level and thick red ware and red slipped ware were more dominant than the other types. The clay used for making the pottery was fine and well-levigated clay. Undoubtedly, from the shapes and size of the pottery, it belongs to the Iron Age period. The excavation does not yield any Tamil-Brahmi shards. The possibility of unearthing Tamil-Brahmi shards in future excavations at this site will reveal its existence.

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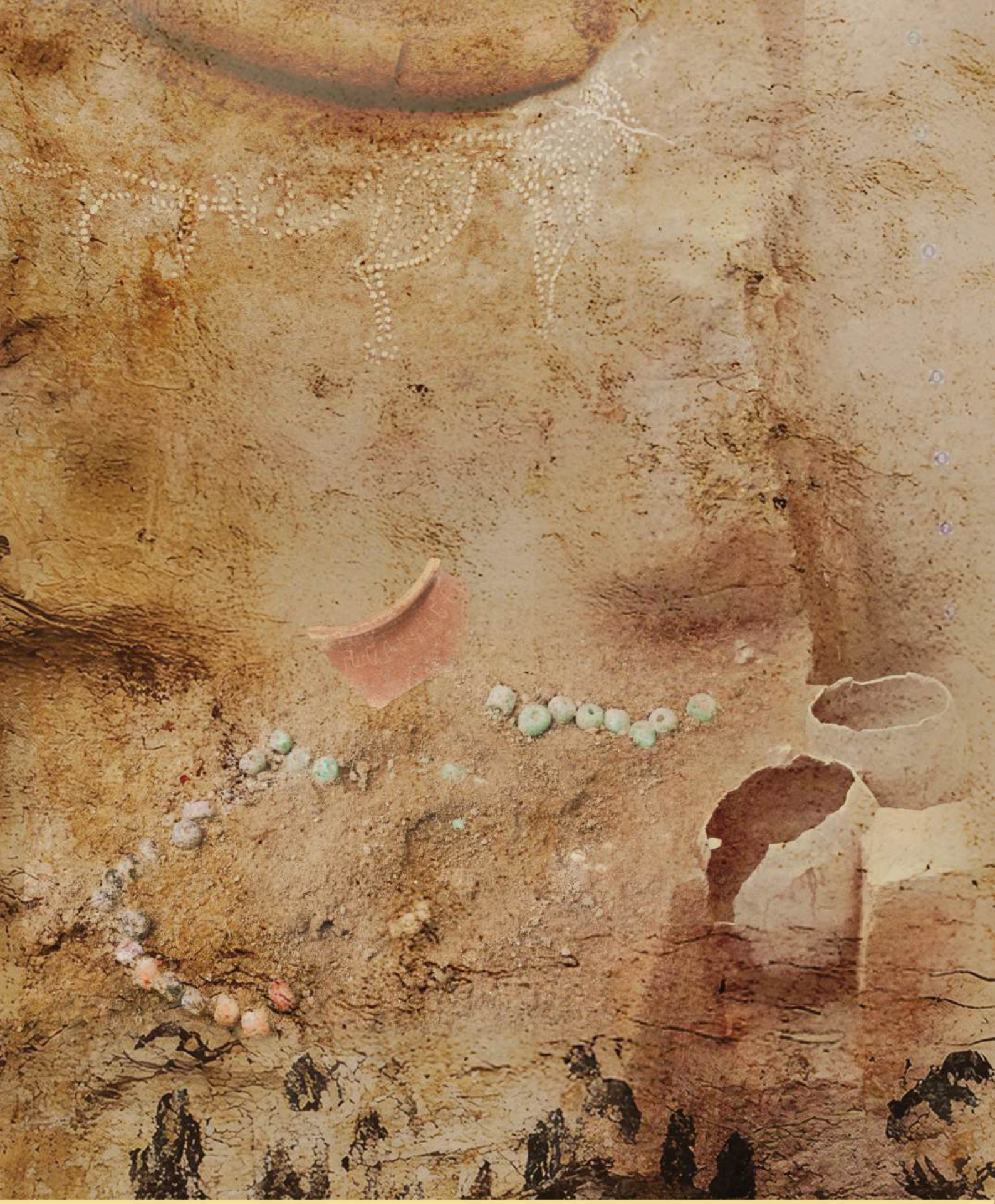

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